VOL. XXVI. Nº 10. OCTOBER 1941

MECCANO MAGAZINE

THE LINESMAN

6D.

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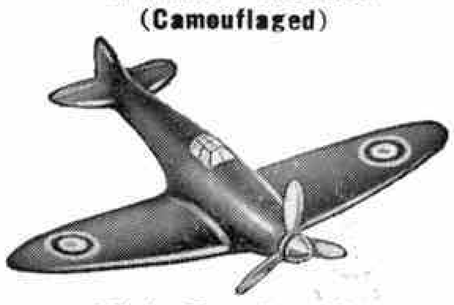

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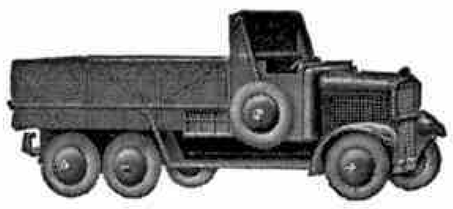

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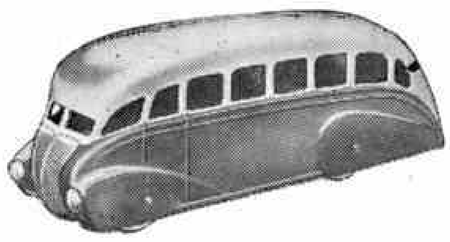

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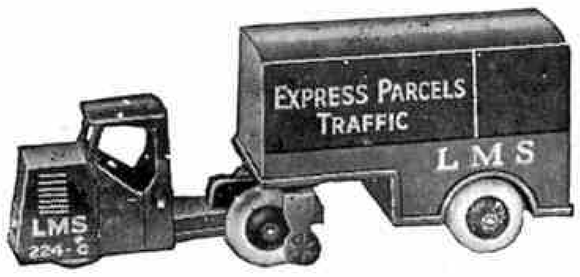

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SPECIAL NOTICE

Will readers of the "*Meccano Magazine*" please note that, due to pressure of other work, we have been compelled temporarily to discontinue our Repairs Department, and no further work of this kind can be accepted.

When we are able to resume work in our Repairs Department we will at once make an announcement in the "M.M." and to our dealers.

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IN these exciting days—when almost every hour the R.A.F. accomplishes feats of daring and heroism that make all past adventure stories seem tame by comparison, everyone wants to know more about the aircraft our men fly. And the best way of doing that is to build the things yourself—in miniature—at home—with a Penguin Kit Set from Hamleys.

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Besides—the R.A.F. want Pilots and Navigators, and your local Air Training Corps wants boys that are keen to know more. So send to Hamleys for a Kit Set. There are Bristol Blenheims at 13/3; Vickers Wellingtons at 18/6, and Vickers Wellesley at 12/6; a Fairey Battle Set costs 8/11; a Hawker Hurricane 6/8; a Hawker Fury 5/6; and a Monospan Ambulance 8/6.

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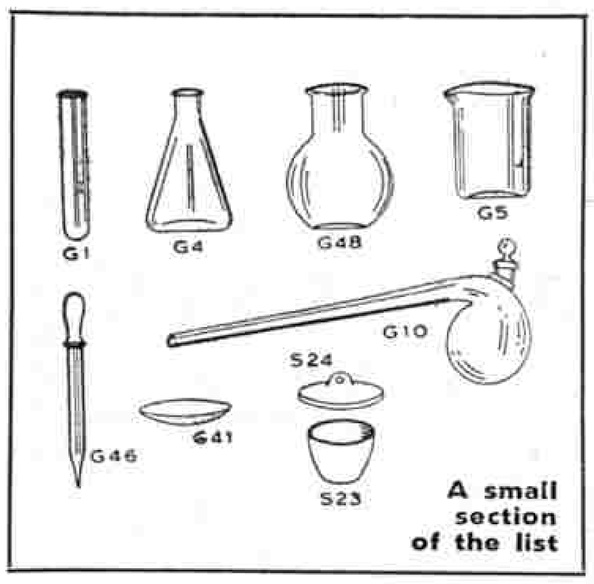
SORRY BOYS,

— BUT THERE IT IS!

We're afraid you are going to have a little more difficulty than in the past in getting our products. Limitation of supplies has meant that we have had to curtail production to some extent, but we are doing our best to distribute fairly all available supplies to toy dealers everywhere.



A small section of the list

If you have a Lott's Chemistry Outfit you can get Spares and extra apparatus to enable you to conduct more absorbing experiments. You can also make up an outfit from the Chemistry Spares List, which we will send you on application. Your dealer will be pleased to help you in the choice of apparatus.

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Ask your toy dealer for full particulars, or write to the Manufacturers (Dept. M.M.) for name of nearest Agent and illustrated lists of all products including Chemistry Spares. 2d. stamp on p.c. or 2½d. stamp on letters, please.

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are always difficult and even more so when they interfere with essential production.

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This is our WARTIME LIST (as illustrated) which contains over 130 pages of our various model supplies listed at present day prices.

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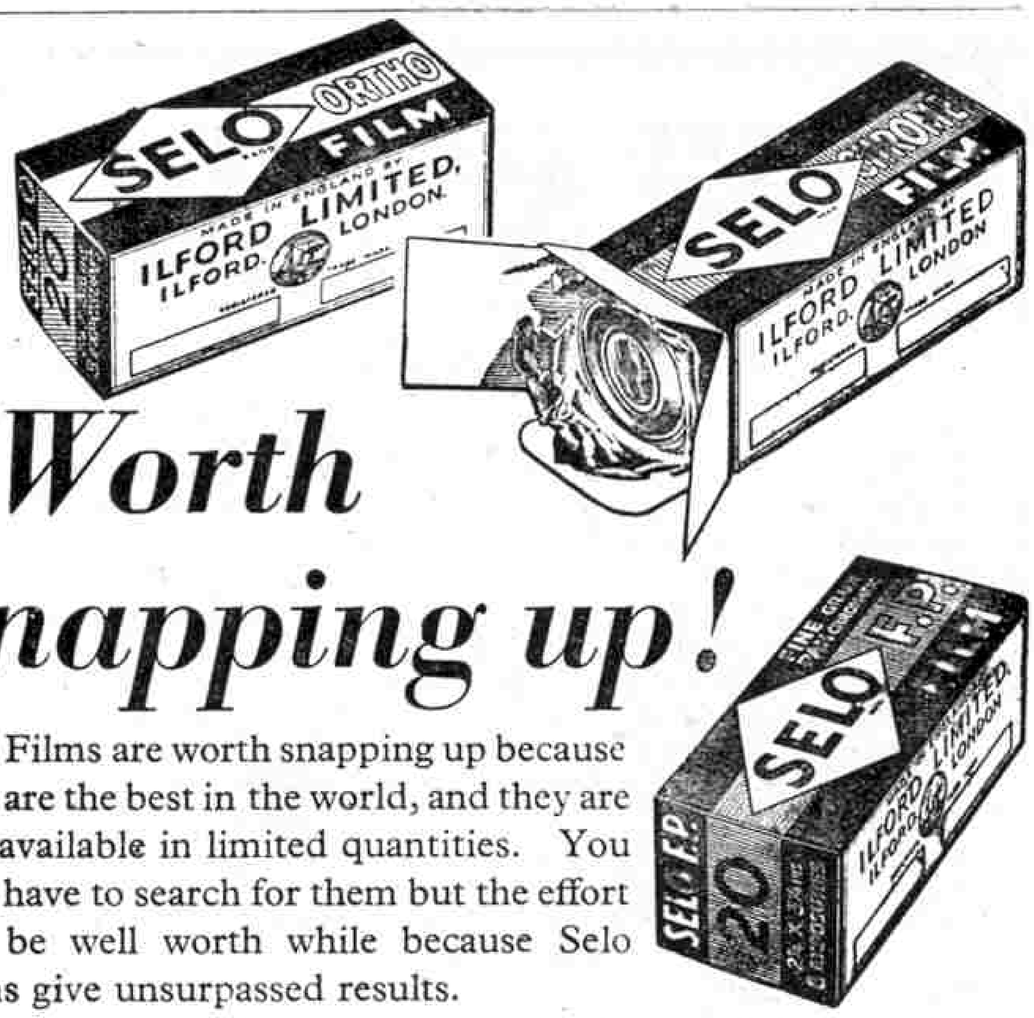

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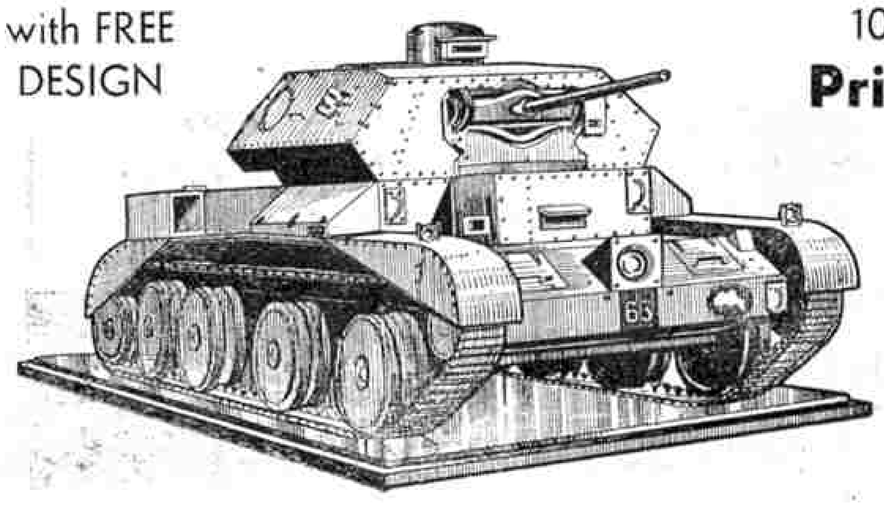
with FREE DESIGN



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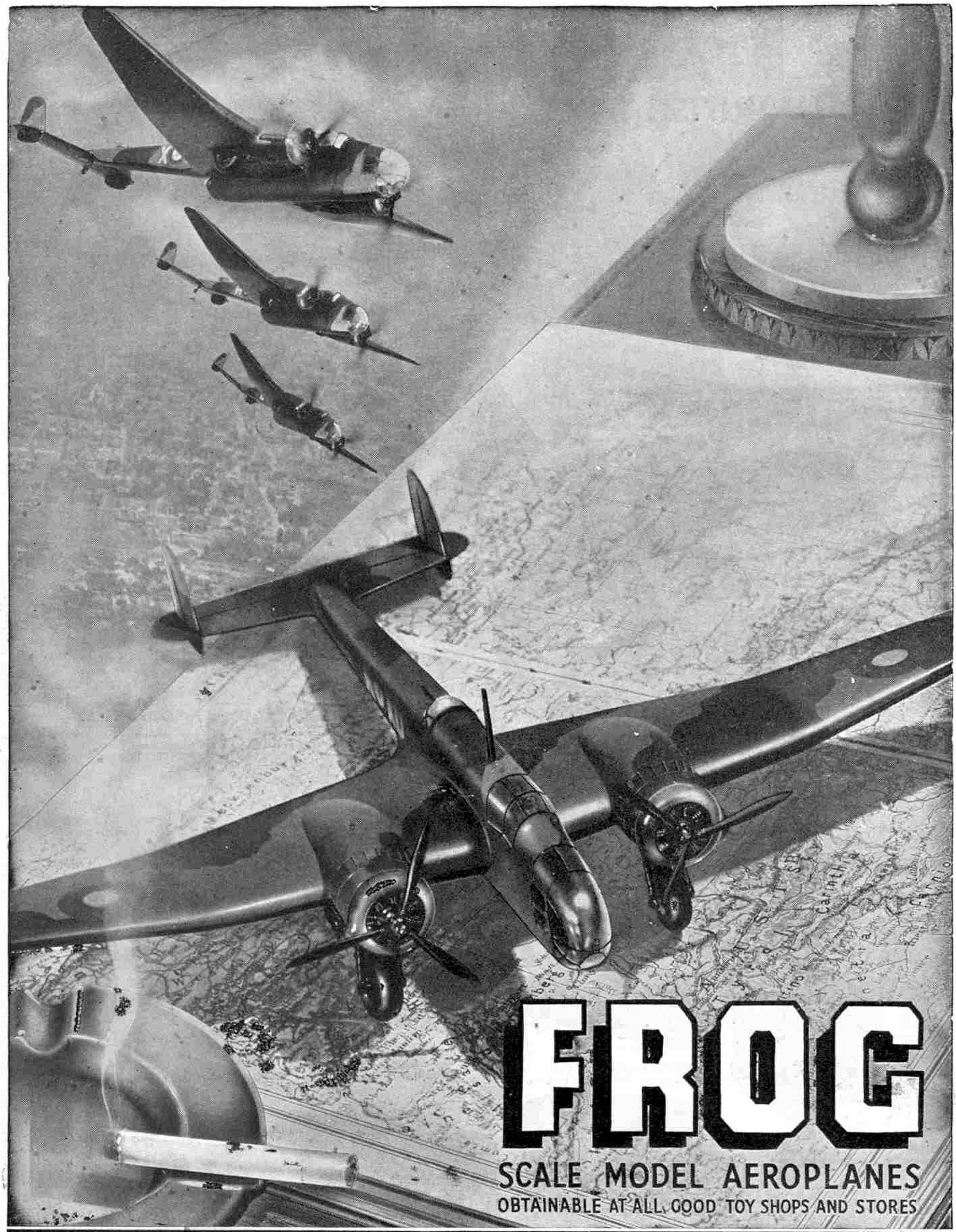
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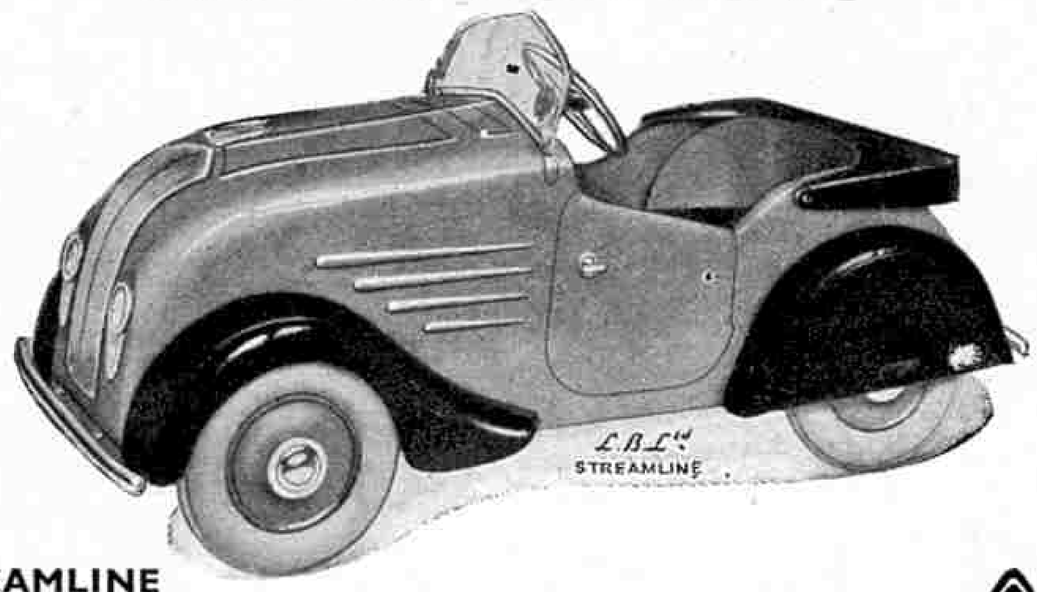

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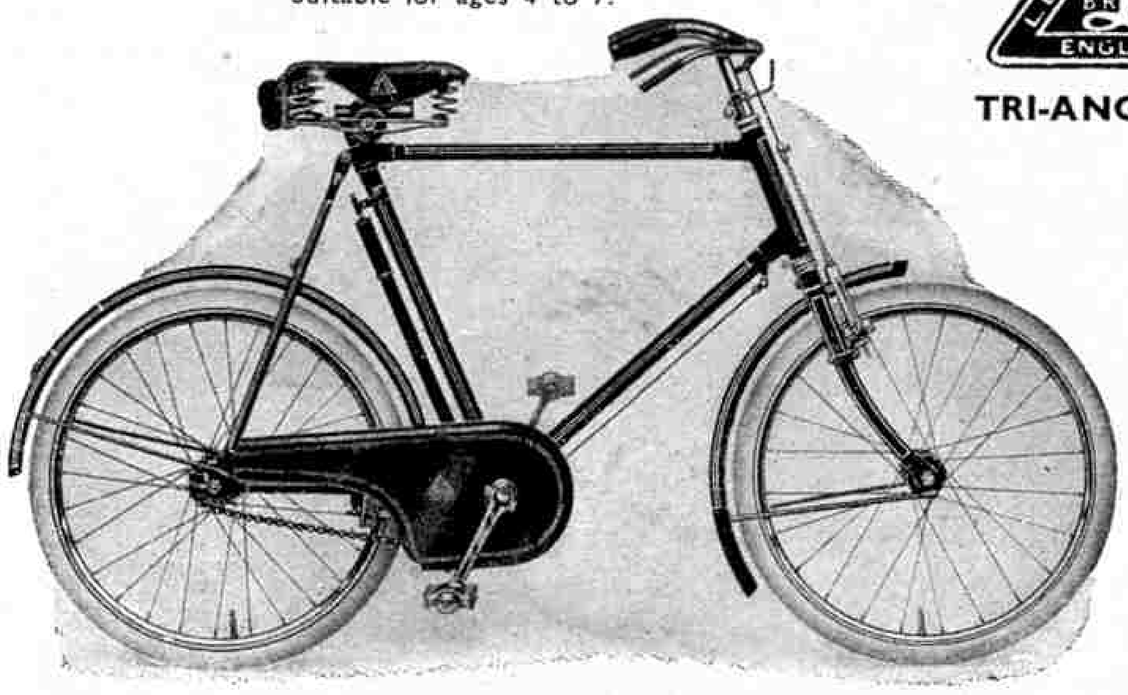

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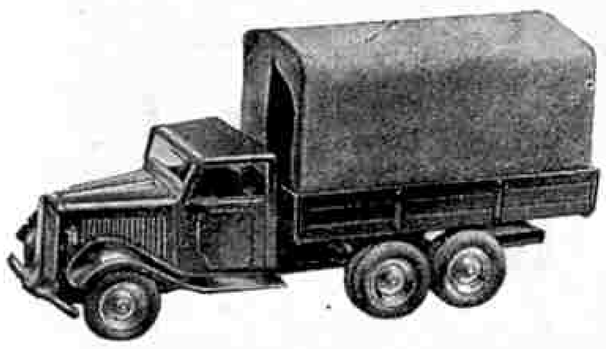
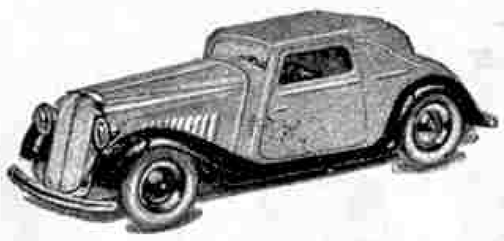
MINIC Mechanical Horse and Lorry with Barrels.



MINIC Canvas Tilt Lorry. Obtainable in camouflage colours.



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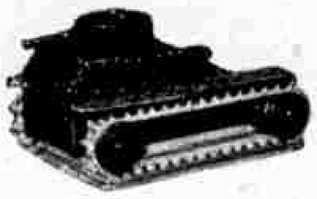

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MINIC Mechanical Horse and Milk Tanker.

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MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
England

Vol. XXVI. No. 10
October 1941

With the Editor

Our R.A.F. Radio Fund

When I launched our special fund to provide battery radio sets for isolated units of the R.A.F. I set out to reach a total of £150. I am glad to announce that this figure has now been passed, the actual total reached being £152. I reproduce below the letter of thanks I have received from the R.A.F. Comforts Committee.

"My Committee have asked me to convey through them the thanks of the Royal Air Force for the excellent response your readers have made to the Meccano Magazine R.A.F. Radio Fund.

"With the money received from this fund it has been possible to provide 36 battery wireless sets and these have been sent to isolated detachments of the Royal Air Force serving under very difficult conditions. The sets have enabled these men to keep in touch with the outside world and have been very much appreciated."

(Signed) Officer i/c R.A.F. Comforts.

This is a good job well done and I send my sincere thanks to every reader who has contributed to the fund. In next month's issue I shall publish the final list of donations, with the Auditors' statement.

Harmonicas for the R.A.F.

And now the Officer in Charge, R.A.F. Comforts, tells me that there is a great demand for harmonicas to be supplied in sets of five to form harmonica bands. Let us see if we can do as well in this direction as we did for radio sets. Address your contributions to the "*M.M. Harmonica Fund for the R.A.F.*"; each one will be acknowledged in the "*M.M.*" I am quite sure that we shall quickly raise sufficient to provide harmonicas and so do something to help to liven up the often dull off-duty hours of small formations of the Royal Air Force.

Air Marshal Sir Richard Edmund Charles Peirse, K.C.B., D.S.O., A.F.C., Air Officer Commanding-in-Chief, Bomber Command, R.A.F.

Leaders in the War

XXIII.—Sir Richard E. C. Peirse

Air Marshal Sir Richard Edmund Charles Peirse was born at Croydon in 1892, and after being educated at Monkton Combe School, in H.M.S. "*Conway*," and at King's College, London, he joined the Royal Naval Volunteer Reserve in 1909 as a midshipman. He became interested in flying, qualified as a pilot in 1913, and early in the war of 1914-18 transferred from the R.N.V.R. to the Royal Naval Air Service, as a Flight Lieut. He took part in the frequent bombing of the German submarine bases established at Ostend and Zeebrugge, and won the D.S.O. by a particularly bold attack upon them in which he sank one German submarine and damaged others.

Sir Richard qualified at the Staff College in 1922, and since then has held a succession of important R.A.F. posts at home and overseas. In 1933 he was sent to the Middle East as Air Officer Commanding the British Forces in Palestine and Transjordan, to deal with the disturbances there; and by this appointment was the first R.A.F. chief to be given supreme command both of Army and R.A.F. in a major operation abroad. In May 1936 he had a narrow escape from death when his car was ambushed by Arabs who fired several hundred rounds at it but failed to hit him. On his return to England that year he was made Director of Operations and Intelligence, and Deputy Chief of the Air Staff.

Sir Richard was appointed Air Officer Commanding-in-Chief, Bomber Command, R.A.F., on 5th October 1940, and at 49 he is one of the youngest heads of the R.A.F. He favours the employment of large-size bombers for carrying out heavy raids.

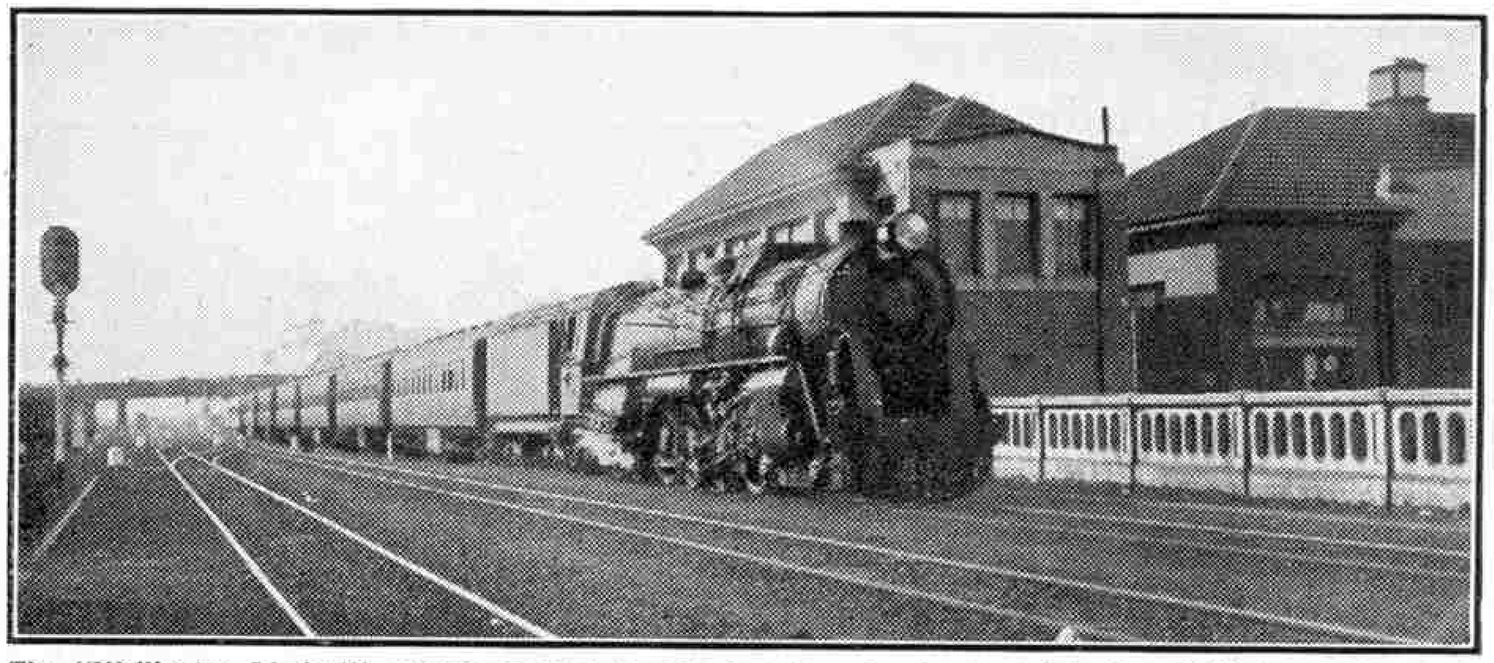
Railway Working in New Zealand

By "A Railway Engineer"

NEW ZEALAND is a young country; how young is not perhaps generally realised, for it was only 101 years ago that the first shipload of British Colonists arrived. Progress was rapid, and despite the disturbing effect of the Maori wars, between 1861 and 1871, the discovery of gold and the development of sheep farming on the grand scale brought many new settlers, and soon a flourishing trade. Railway construction began, but in a very difficult country the mileage actually operated did not increase rapidly. For example, the two principal cities of the North Island, Wellington and Auckland, were not connected by a through railway until 1909, and it was as recently as 1923 that railway communication between the east and west coasts of the South Island was first established. Everywhere the railways go in New Zealand there are mountain ranges to penetrate, a deeply indented coastline to make connection between seaboard towns difficult, and strenuous competition from rival forms of transport.

But the comparatively recent development of the New Zealand Railways has enabled the fruits of experience in Britain and in other parts of the Empire to be enjoyed, so that in some ways the layout and equipment is more completely up-to-date than elsewhere. The signalling provides a striking example. Up to 1900 there had been no interlocking at all, and no really adequate protection for the main lines, which were single practically throughout. Instead of going through all the teething troubles experienced at home, when the root principles of signalling were being established—often as a result of disastrous accidents—the New Zealand Railways were able to select the British system most suited to their needs, and instal it straight away on a considerable scale with complete confidence in its reliability. Similarly when the coast to coast route in the South Island was opened in 1923, colour-light signals were used from the first. In the same way the Hutt workshops, which recently have built such splendid locomotives, have had the long experience of others on which to base their layout and methods.

The railways in the North and South Islands are run virtually as separate concerns, each having its own Divisional Superintendent and Locomotive Engineer. In the North Island there is a continuous line from Opua, in the far north, through Auckland, to Wellington, situated on the Cook Strait. Thirty odd miles across, on the South Island, Picton is also a railhead, but this line runs only for a short distance along the east coast. The main trunk line of the South Island begins 70 miles farther south, at Parnassus; following the coast for the bulk of the distance this route



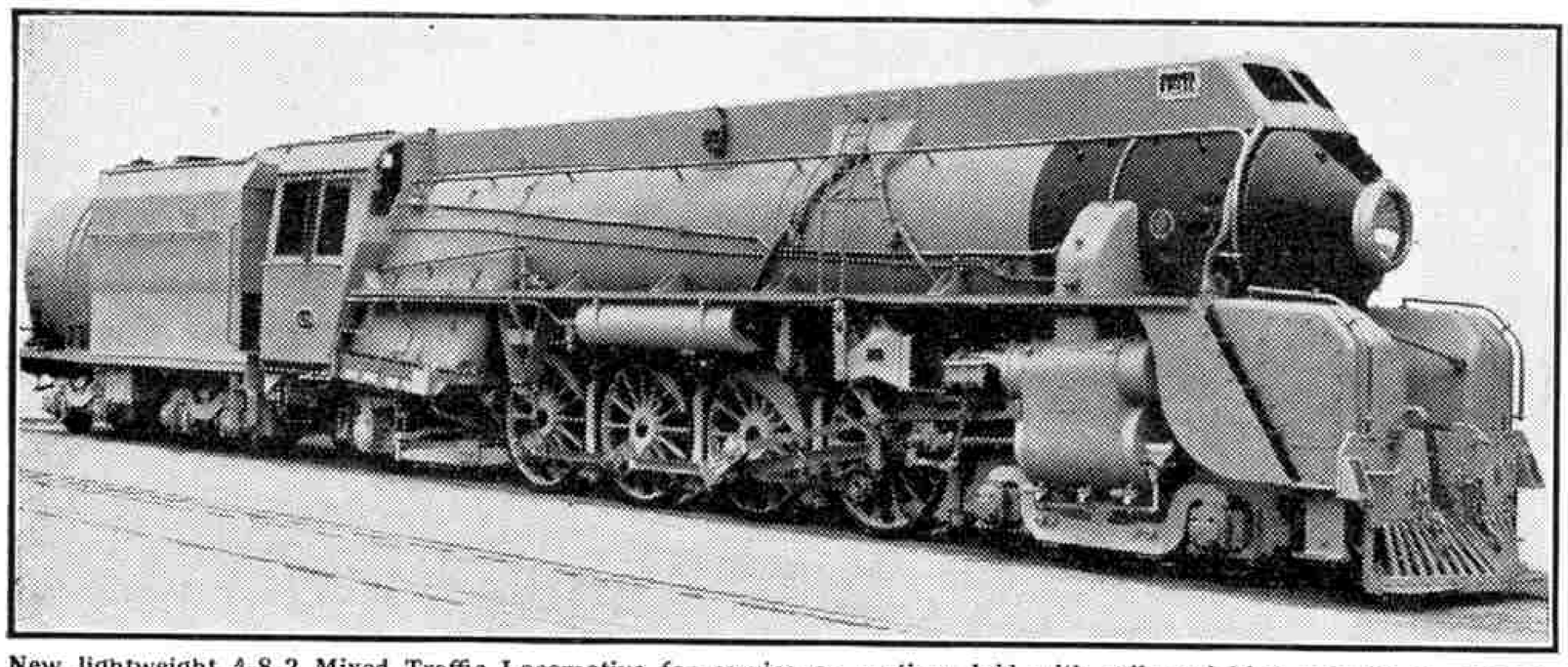
The "Wellington Limited" express entering Auckland station, hauled by 4-8-4 class "K" locomotive. This photograph and those on the next page are by W. W. Stewart.

links Christchurch and Dunedin with Invercargill, at the extreme south end of the island. The most important traffic centres are around Christchurch, and in the quite complicated network of lines in the south lying between Dunedin and Invercargill; here the Maori station names alternate with more familiar ones reminding us that many of the earliest colonists were Scots. One finds Tokanui and Athol; Waipahi and Kelso; and a little farther north Pukeuri Junction and St. Andrews!

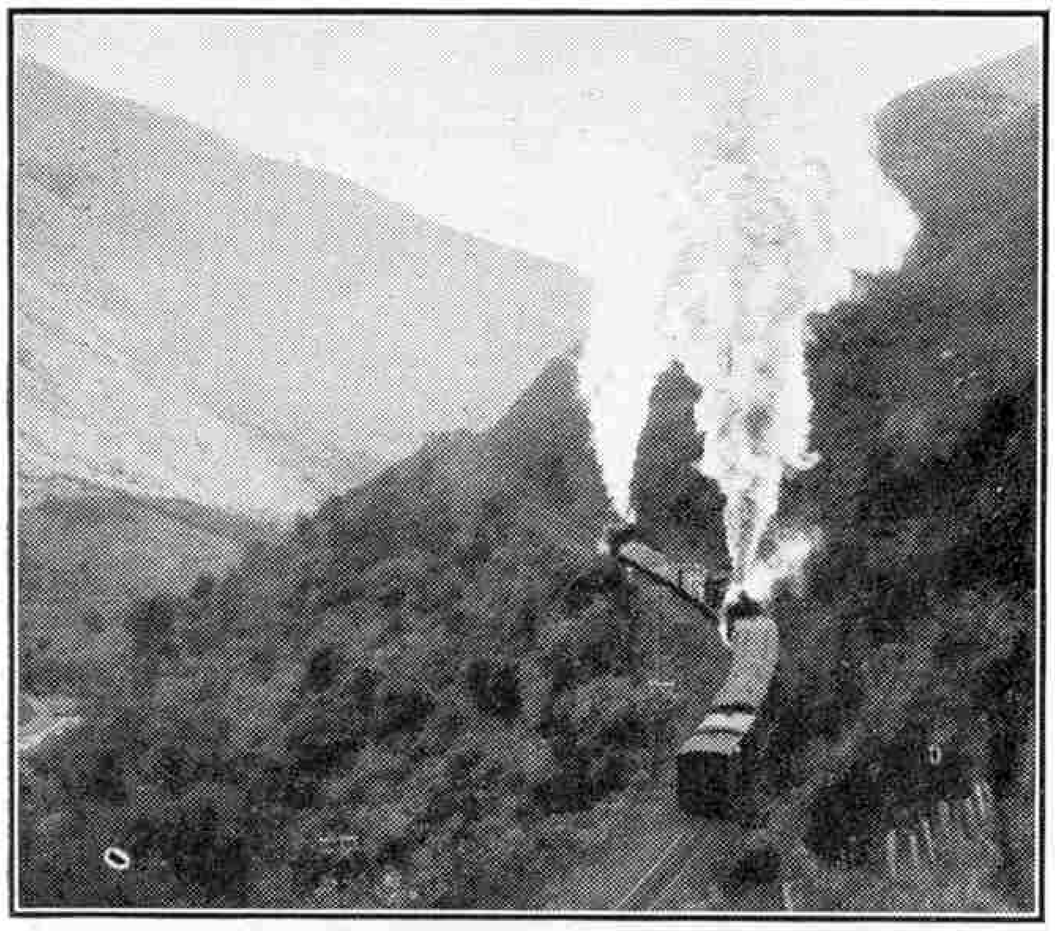
Although the railways subsequently have been somewhat hampered by the early standardisation of the 3 ft. 6 in. gauge, the stations and marshalling yards have been laid out in a spacious manner that may well be the envy of operating and engineering officers on our home railways; the illustration on page 303 of the fine new station at Auckland shows that an immense amount of space is available for further tracks or buildings that future developments may require. Traffic problems are many, through road competition for passengers and coastal shipping for goods. At one time it was the practice to run mixed trains in the sparsely populated districts, but the delays experienced in passenger journeys led to the separation of services, and passengers are now much more efficiently catered for by various briskly scheduled railcar runs.

On all routes in New Zealand heavy gradients are the bugbear of train operation, and on the main line of the North Island, between Wellington and Auckland, no less than 60 per cent. of the mileage is on grades of 1 in 200 or steeper. Every ordinary gradient fades into insignificance however beside the terrific Rimutaka incline, on the east coast route northward from Wellington. Here the grade is 1 in 15 for three solid miles, which of course no ordinary locomotive could negotiate. It is not only a matter of tractive power in ascending, but also of braking on the descent. Special locomotives of the "Fell" type are used; a double-headed rail is laid centrally in the track over the entire length of the incline, and the locomotives have horizontal-gripping wheels that engage with this central rail. Brakes grip the central rail on the descent. The maximum load for one engine on the incline is about 60 tons, and when heavier trains are operated, double, triple, and quadruple heading is necessary according to the tonnage. It is not permitted to attach all the motive power at the front; each engine must be ahead of its own proportion of the load, so that a quadruple-engined train of 240 tons has one engine leading and the others spaced intermediately along the train.

Plans are now well advanced, however, for an avoiding line. This will include a tunnel 5¼ miles long, but will reduce the gradient from 1 in 15 to 1 in 132, and obviate all the trouble and expense involved in the special operating measures needed on the Rimutaka incline. Through this long new tunnel all trains will be electrically hauled. New Zealand already boasts the longest tunnel in the Empire, the 5¼-mile bore of Otira, on the coast to coast line in the South Island. The railway in this region cuts through some very difficult country, the tunnel lying adjacent to Arthur's Pass, in the Southern Alps. In the approach to the main tunnel there are 17 others



New lightweight 4-8-2 Mixed Traffic Locomotive for service on sections laid with rails weighing only 50 lb. per yd. It was built by the North British Locomotive Co. Ltd., by whose courtesy this photograph is reproduced.



A two-engined train ascending the 1 in 15 gradient of the Rimutaka incline.

in a distance of nine miles. Through the Otira tunnel the gradient is 1 in 33; with the heavy pulling necessary the atmosphere from steam traction would be unthinkable, and so like the great tunnels in the European Alps, electric traction is used, for a section nine miles long.

Here, as previously mentioned, colour-light signalling is used; in fact the whole cross-country route, from Christchurch on the Pacific Ocean to Stillwater on the Tasman Sea, is automatically signalled throughout. Although there are some notable interlockings in New Zealand, particularly the all-electric plant at Wellington, and the electro-pneumatic installation at Auckland, the most interesting working is to be seen on the long sections of single line. Traffic on the cross-country line, via the Otira tunnel, is very infrequent, amounting only to two or three trains a day in each direction. On a normally busy single line, such as the West Highland section of the L.N.E.R. in Scotland, the electric tablet system is the most economical way of working, but this entails staffing signal boxes at all the crossing loops. In New Zealand it has been found more economical to instal continuous track circuiting, and what is known as the "absolute-permissive" system of automatic block working. This enforces the ordinary single-line block working between trains travelling in opposite directions, but permits train running in the same direction—a heavy passenger express, for example, running in two portions—to follow each other as in ordinary automatic signalling on double lines.

Progress is of course fairly slow on these single lines, and the crews of trains passing at the loops have to operate the points themselves; these points, though hand-worked, are electrically locked, so that a route cannot be set up that conflicts with the instructions given by the signals. With so few trains it would hardly be desirable to keep the automatic colour-light signals with their lamps burning all day and all night, and so additional track circuit controls are used that cause the signals to light up only on the approach of a train.

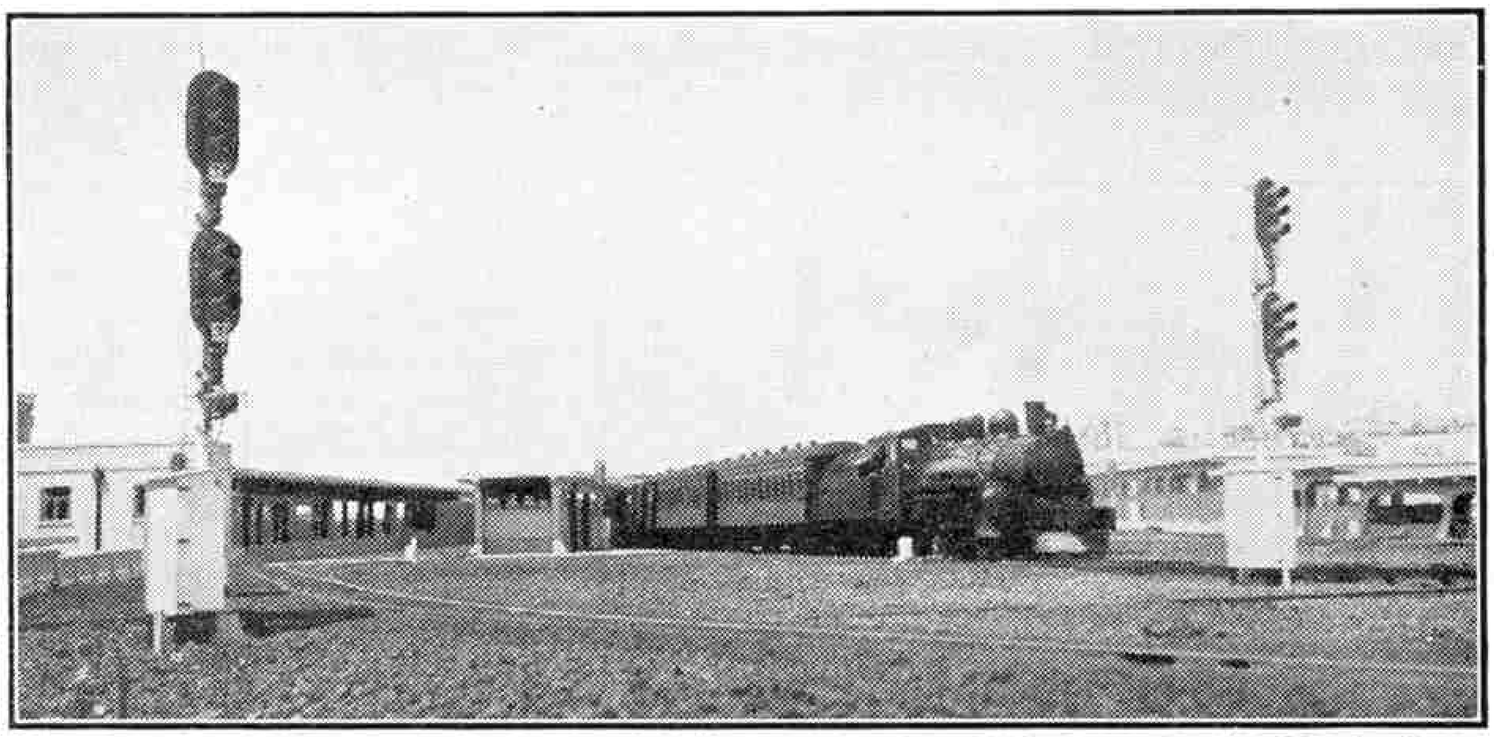
In the busier areas nearer to the big cities single line working is still found, though of course the somewhat leisurely method of operation just described is not suitable; particularly is this so in the neighbourhood of Wellington where local traffic is worked by multiple unit electric trains. In such districts the Centralised Traffic Control system is used, similar to that in operation for some time on the Stanmore branch of the former Metropolitan Railway. The passing loops are unattended, but points and signals are electrically operated from a control machine situated anything up to 20 miles away. One signalman only is needed to look after a long stretch of single line with many passing loops, and seeing at a glance, by means of an illuminated diagram, all train movements in the area, traffic can be very efficiently conducted.

Turning now to locomotive power, the New Zealand Railways, until quite recently, relied on the famous "AB" class "Pacific" engines for all main line work; they are decidedly American in appearance, with sand-box carried on the top of the boiler and looking like a second dome, cow catcher, and large electric headlight. For "Pacifics," even on the 3 ft. 6 in. gauge, they are not large, having a tractive effort of only 20,000 lb., against over 40,000 in an L.M.S.R. "Princess Royal." The tenders are very distinctive, having the Vanderbilt design of circular water tank, and looking more like an oil container than anything else. For shorter distance traffic around the big cities a class of 4–6–4 tank locomotives is used. These are very similar in general proportions to the main line "Pacifics," but have the additional adornment of a third "dome" on the boiler.

Some splendid new locomotives have recently been put into service. Foremost among these are the big Class "K" 4–8–4s, the first of which was completed at the Hutt works, Wellington, in November 1932. The tractive effort is no less than 50 per cent. greater than in the "AB" class "Pacifics," and this has proved invaluable in the operation of heavy passenger traffic in the North Island. These Class "K" engines are a straightforward two-cylinder job, fitted with a very powerful boiler and ample fire-box. The coupled wheels are 4 ft. 6 in. in diameter, and the cylinders 20 in. in diameter by 26 in. stroke. One of the great difficulties besetting the locomotive department in New Zealand is the limitations on axle loading imposed on account of the light character of much of the bridge work. Even this seemingly large engine has a total adhesion weight of only 52½ tons, roughly 13 tons per axle, in comparison with the 22 tons per axle permitted in this country. With such a handicap one can readily appreciate the skill in design that has produced so powerful and efficient a locomotive. To assist in ascending the many severe gradients a booster is fitted, operating on the trailing truck.

Yet another striking new design, introduced last year, is a 4–8–2 mixed traffic locomotive. This again is an example of triumph over physical difficulties, as the type has been designed to work over sections of line laid with fairly lightweight rails. In this country our main lines are laid with rails weighing 95 lb. to the yard, but these New Zealand 4–8–2s work on 50-lb. rails. Like the 4–8–4s just described they have 4 ft. 6 in. coupled wheels, but the cylinders are only 18 in. in diameter.

Apart from the general proportions, there are some very interesting features about the design of these engines. Great care has been taken to reduce weight wherever possible, as for example in the connecting and coupling rods, which are of a high-tensile manganese-molybdenum steel. An appreciable saving of weight is effected also by the elimination of all rivets in the fire-box construction; this is of steel, and is welded throughout. A degree of streamlining is introduced, whereby the boiler mountings are encased, and this adds a distinctive touch to a bold, essentially modern locomotive outline. The Vanderbilt tender tanks, which were not used in the Class "K" 4–8–4s, have re-appeared on these engines. Although designed in New Zealand, by Mr. P. R. Angus, the Locomotive Superintendent, the 40 engines of this class have been built in Scotland, by the North British Locomotive Co. Ltd.



The new station at Auckland, showing the spacious layout, method of ballasting, and colour light signals.

Train speeds are not high, and the run of the crack night express from Wellington to Auckland, which covers its 426-mile journey at an overall average speed of 30 m.p.h., represents about the fastest done. The latest passenger rolling stock is certainly among the best in the world, however, and in the comfort of the luxurious air-conditioned coaches such long runs can be most enjoyable.

A Chinese junk with its much-patched sail, off Hong-Kong.

Hong-Kong

Sights and Scenes in Our Far Eastern Outpost

By Harold J. Shepstone, F.R.G.S.

HONG-KONG, our naval base and shipping centre in the Far East, has for a century been the seat of British authority in this part of the world, and the preparations that have been made to defend it show that the colony intends to maintain its independence at all costs.

Hidden barriers of various kinds are ready to check the activities of invading submarines. From high up on peaks that rise about the harbour grim guns frown down; at Happy Valley race track, right under the guns, thousands of holiday-makers cheer the running Chinese ponies. Blue-clad schoolboys, marching along under the guardianship of watchful priests, wait to let a line of trucks go by—trucks hauling still more guns up to the peaks and manned by bearded Indian soldiers in coloured turbans and khaki shorts. Chinese girls with bobbed hair, out for a picnic, pause to smile at British Tommies digging bomb shelters just behind a fashionable bathing beach where machine gun pill-boxes squat among summer cottages.

Enough barbed wire to fence in all the cattle in a Canadian prairie province stretches and tangles about hilltop searchlight posts, powder magazines and gun emplacements, and across valley trails up which enemy landing parties might try to march. At a church fair at Kowloon—that part of the colony which stands on the mainland peninsula just across the narrow bay from Hong-Kong island—you see excited Chinese and Portuguese boys and girls throwing darts, playing catchpenny games, eating, drinking, singing. All are oblivious to a line of tanks just unloaded from a ship and rumbling past to be added to the colony's ever-growing defensive machinery.

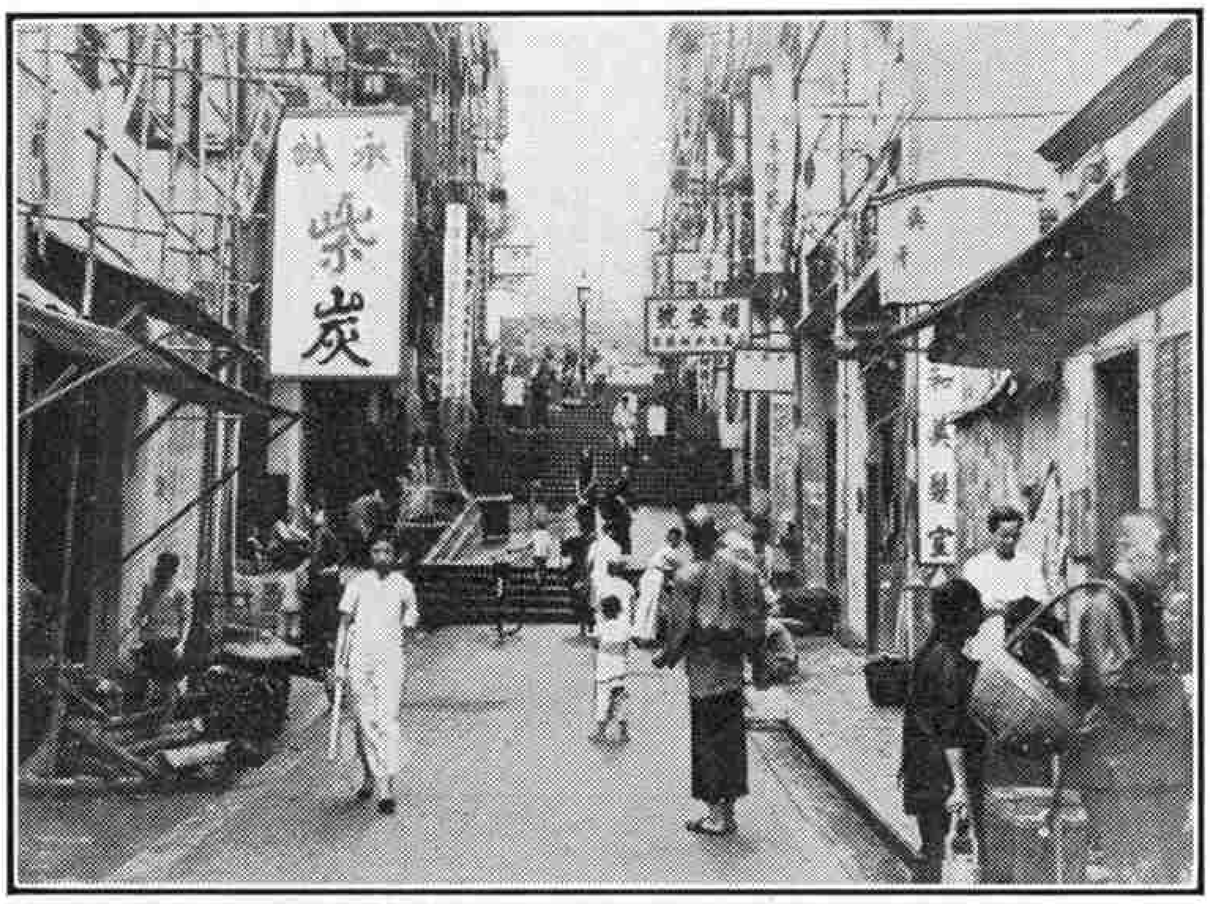
A section of Hong-Kong as seen from the sea.

On top of all this defensive preparation the colony has been called upon to devote attention to other problems. There has been the question of refugees, over a million of whom, fleeing from the bombs and bayonets of the Japanese, have sought shelter. Hong-Kong to-day is the greatest house of refuge in all the troubled Orient. Special refugee camps have had to be erected to deal with these hosts of homeless people. In these clean, orderly camps are mess halls, dormitories, hospitals, playgrounds, schools, vast kitchens, and even gardens where the refugees grow their own vegetables. In addition to the homeless who in their tens of thousands have sought refuge in Hong-Kong, there have arrived also hundreds of rich Chinese merchants from the coast and inland cities. Deposits in the banks have soared to enormous figures, and one local newspaper declared recently "Hong-Kong now has more than 500 Chinese millionaires," that is individuals worth a million Chinese dollars, roughly about £500,000 of our money. On another page of the same paper, however, we learn that 27,000 people still sleep in the city streets.

Yet, side by side with this refugee flood and the continuous building of defences, the ordinary normal life of the colony still goes on. As a centre for the transhipment of merchandise Hong-Kong is beginning to feel the pinch, however. Up till now it has been the second port of the Empire. In normal times some 20,000,000 tons of shipping clears and enters Hong-Kong annually, the estimated annual value of the colony's trade being up to £50,000,000. When we first went to Hong-Kong it was little more than a barren island, the haunt of pirates and inhabited only by a few fisher folk.

The island of Hong-Kong is 11 miles long and from two to five miles broad, with an area of 32 square miles. It is separated from the mainland by a narrow strait scarcely half a mile wide. At a later date the Kowloon peninsula on the mainland

Coaling up at Kowloon. The Chinese coolie wears a conical-shaped hat to protect him from the sun and when it rains he puts on a cape and tunic shirt made from leaves.



Typical street scene in the Chinese quarters of Hong-Kong.

was added to the colony, bringing the total area up to about 400 square miles. The population of the colony is about a million, over 85 per cent. being Chinese.

The city of Victoria, the capital, lies on the northern shore of the island, facing the mainland. In between is the harbour, with a water area of some 10 square miles; and to take a small boat and cruise for a day about this harbour is to find another world. Some 100,000 people live on their junks and sampans, being carried ashore only when they die. Here more than 1,000 sea-going steamers have been launched and wooden junks by countless thousands; yet the colony yields neither wood nor metal with which to build such boats. The harbour is lined with wharves, warehouses, docks, repairing depots for ships and shipbuilding yards.

The city stretches away up the towering face of the island to a height of 1,500 ft. One notices the many beautiful residences of British and Chinese merchant princes, perched in nooks and corners of the precipitous mountain side. From the heart of the city runs the funicular railway up Victoria Gap, which Rudyard Kipling described as a "tramway that stood on its head and waved its feet in the mist." At each of its five stations are roads cut from the mountain side, winding away to right and left and giving access to the houses along its level. Further east, twisting and turning round the shoulders of the hills, a modern road climbs into the clouds. The mountain roads are bordered with palms, tree-ferns and flowers. Victoria Peak, the highest point on the island, stands 1,800 ft. above sea level and is crowned by a signal station.

A walk of two minutes from the landing place brings you into the heart of the business quarter of the city. Large hotels rub shoulders with luxurious European shops, and jammed between them are the many big banks into which rich refugees have poured their money. Land here is almost as costly as it is in the city of London; yet in the very shadow of towering granite banks, courts and office buildings one finds an open park with a statue of Queen Victoria, a plaza with a cenotaph, and a green cricket field.

It is the purely Chinese quarters of the city that interest the visitor most. Here the streets are filled with a seething mass of humanity. The Chinaman is a cheerful individual with a love of shining things, and a gregarious instinct that makes him seek the company of his fellow men. The street is his club, his lounge, a playground for his children and a drawing room for his womenfolk. Coloured banners and great Chinese signs in red or gold blazon forth on vertical signboards outside the shops, supplemented in some cases by an English translation. Some of the translations are not without humour. "Come to me, honest man"; "No swindle here"; "You can cheat me"; "I no spittee on clothes when washen"; these are a few examples!

True to Oriental form, each trade here seems to have its own street or locality; the wood-workers crowd together, so do the leather-workers, fire-cracker makers, grocers, and so on. It is said that blind men here easily find their way about, identifying the street they are in by the smell of it! Chinese restaurants abound; in the cheaper ones patrons dine off rice, dried fish, preserved eggs, soups and stews; in the better-class places wealthy Chinese merchants enjoy such delicacies as birds'-nest soup, sharks' fins, frogs, and chicken and rice.

It is a city of contrasts and even contradictions. You can travel about in a sedan chair hauled by half-naked coolies, or you can go by bus or taxi. If you take the trouble to enquire you will discover that chair, bus and taxi alike are owned by the Chinese; they control also the ferries that carry passengers and goods across to Kowloon.

There are five large departmental stores in the colony belonging to the Chinese. There are banks, shipping, and insurance companies, contracting firms and shipbuilding yards owned by them, as well as scores of factories that make many things, from cotton cloth and rattan ware to all kinds of cosmetics. The "Lyons" of Hong-Kong is the great confectionery establishment of On Luk Yuen, a purely Chinese concern that has shops all over southern China. It sent its manager all the way to America to buy the latest type of candy and ice-cream making machinery. The hundreds of workers in the factory and in the shops are Christians, and once a week they take an hour off for prayers. To-day they are praying for the success of the British cause.

A Chinese woman carrying merchandise from the wharves at Hong-Kong.

Such is Hong-Kong, now within the theatre of strife, but determined to carry on, confident in its ability to hold its own.

AIR NEWS

Pan American Airways to Operate to Middle East

The crews who fly American military aircraft to Britain are "ferried" back across the Atlantic by air, so as to be available for further duty as quickly as possible. The ferrying system has proved a great success, and President Roosevelt has announced that an agreement has been made with Pan American Airways under which that company will organise and operate a ferry system to deliver American aircraft to the British forces in the Middle East. The company have applied to the United States Civil Aeronautics Board for a permit to operate a commercial air service between the United States and the Belgian Congo, along a route which would be followed by the bombers.

It is expected that Douglas DC-5 air liners will be used for the transport service, and the route proposed is from New York or Baltimore to San Juan, in Puerto Rico, then further south to Port of Spain, in Trinidad, and on to Natal, on the coast of Brazil. From Natal the aircraft will cross the South Atlantic to Monrovia, on the coast of Liberia, and go on to Lagos, in Nigeria, and finally to Leopoldville, in the Belgian Congo.

A separate application is to be made to the Board for authority to operate a trans-African service, which it is understood will follow a route developed and used by British Airways.

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An air mail service between Great Britain and Northern Ireland was introduced on 1st September last.

New R.A.F. Fighter Squadrons

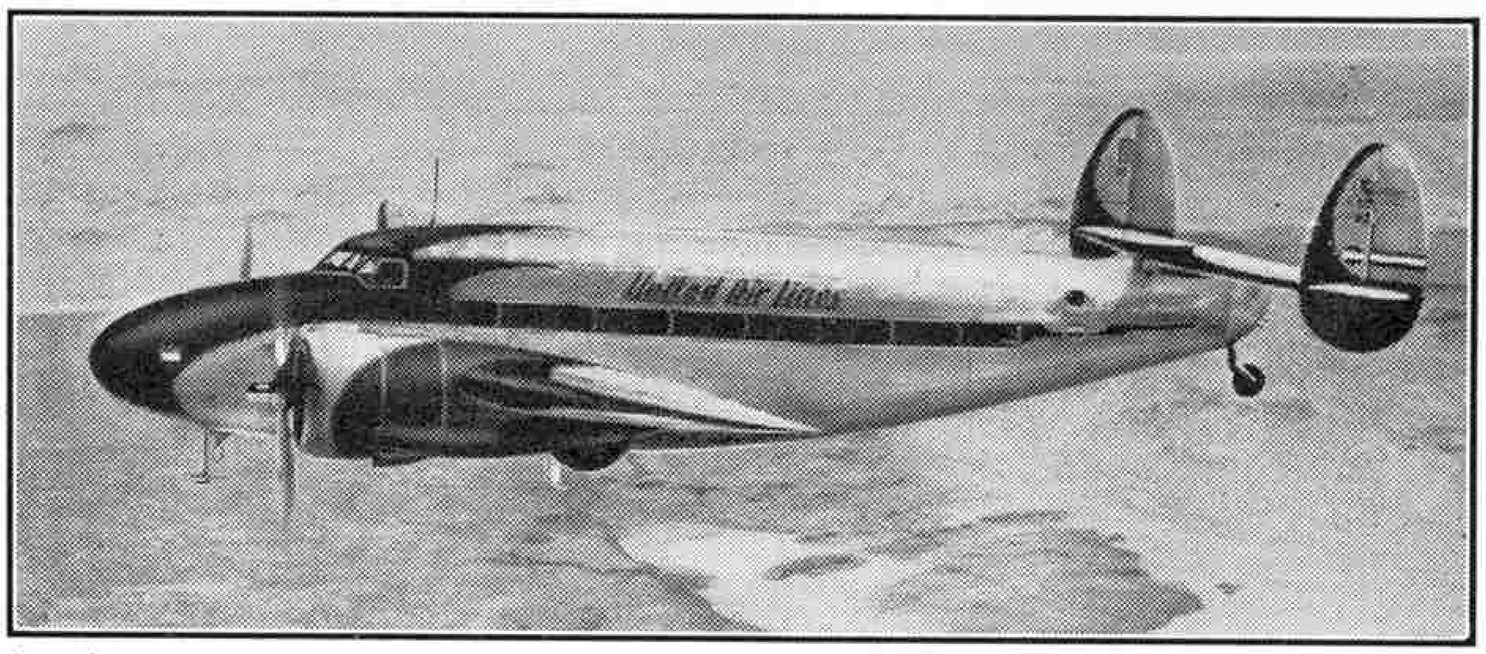
New R.A.F. fighter squadrons include a second all-Norwegian one, equipped with "Hurricane" fighters. In this squadron are both Norwegian Air Force and commercial pilots, several of whom escaped from Norway after the German occupation. The first R.A.F. all-Norwegian squadron is equipped with Northrop Patrol Bomber seaplanes—American machines built for the Royal Norwegian Air Naval Service—and is attached to the Coastal Command.

A second R.A.F. all-American "Eagle" squadron also has been formed.

Douglas DC-5 Makes Goodwill Flight

An interesting goodwill flight from Batavia to Sydney, Darwin, Brisbane, and Melbourne, in Australia, was made recently by a Douglas DC-5 air liner of the Royal Netherlands Indian Air Lines Company, generally referred to as the K.N.I.L.M. The flight took place to mark the opening of the company's new office at Sydney, and the machine, with a full load of passengers, was flown by Capt. G. van Messel, the company's chief pilot, with a second pilot accompanying him. It was the first time that an aeroplane fitted with a tricycle undercarriage had visited Australia, and great interest was shown in it.

The first part of the return trip to Batavia, from Sydney to Darwin, 2,225 miles, was accomplished in a day, with three stops on the way, and the remainder of the journey, via Koepang and Bali, was completed the next day. The entire goodwill flight totalled about 10,000 miles and took just under 46 hrs. flying time.



One of the graceful Lockheed "Lodestars" of United Air Lines, an American company. Several machines of this type have been acquired by British Airways and are in service on their trans-African air route. Photograph by courtesy of Lockheed Aircraft Corporation, U.S.A.

A Double Airscrew

One of the directions of research to increase aircraft performance still further is concerned with the important part played by the airscrew in improving take-off and making possible greater power and greater height. The latest success in attaining these objectives is the contra-rotating airscrew just produced by Rotol Airscrews Ltd. It is really two constant-speed, three-bladed airscrews mounted on concentric shafts, which can be driven from a single engine. The front set of blades rotate in a clockwise direction and the rear set anti-clockwise. It is claimed that the new airscrew will, among other things, prevent the tendency of an aeroplane to swing off its course at take-off, and improve take-off and manœuvrability generally. We hope to give a full account of the airscrew in a later issue.

"Catalinas" to be Built in Canada

Mr. R. B. Bell, Canada's Director-General of Aircraft Production, has stated that Consolidated "Catalina" twin-engined flying boats are to be produced in Canada. This fine type of aircraft has a range of about 4,000 miles, and in service with the R.A.F. Coastal Command, did good work in shadowing the German battleship "*Bismarck*." "Catalinas" are playing a big part in the battle of the Atlantic, and others are in use in the Netherlands East Indies. The U.S. Navy have used this type of aircraft for several years.

The "Catalina" carries a crew of six, and its armament is in two "blisters" in the fuselage, behind the wing. It is a high-wing braced monoplane.

The birthplace of the Stearman training aircraft, used so extensively by the United States Army Air Corps and United States Navy. Photograph by courtesy of the Stearman Aircraft Division of the Boeing Airplane Company, U.S.A.

Aircraft Spotters' Efficiency

The Commander of an R.A.F. heavy bomber squadron has shown his appreciation of the co-operation existing between the Royal Observer Corps and the Royal Air Force by presenting a silver cup for competition among members of the Corps near his station. In the first contest for the trophy the competitors had to identify photographs of 37 British and enemy aircraft taken from unusual angles. The winners were an R.O.C. post of 20 men, of whom five made only a single mistake and the rest attained full marks.

United States Army Air Corps News

An Atlantic air service operated chiefly for officials of the United States Government has been started. It is maintained by pilots of the United States Army Air Corps, flying Consolidated "Liberator" bombers bearing American service markings, but unarmed. On their eastward flights the machines take off from Newfoundland, but the route followed is secret. This new service was strongly advocated by Major-Gen. H. Arnold, Acting Deputy Chief of Staff for Air, after his visit to England early this year, and he has appealed for 100 volunteers from among American air transport pilots to enable the service to be made a daily one.

At the time of his visit to this country Major-Gen. Arnold was also Chief of the Army Air Corps, but he has since been succeeded in this capacity by Major-Gen. G. H. Brett, who is in charge of big expansion plans by which the Corps is to be increased by 30,000 pilots and 100,000 mechanics a year. The planned increase in aircraft is 50,000 machines a year.

Another new activity of the U.S. Army Air Corps is the formation of a Ferry Command to fly American-built aircraft for Great Britain from the factories to the Atlantic coast, and Col. Robert Odds of the Corps has been given charge of this Command. Two schools are to be established at which the junior pilots who will be appointed to the Command will receive instruction on twin-engined and four-engined aircraft. In ferrying the military aircraft destined for Britain along the transcontinental air routes of the United States relays of pilots may be used, in which case the change-over will be made at checking stations along the routes, where the aircraft will be serviced.

"Tiger Moth" Production in New Zealand

During the war nearly 200 D.H. "Tiger Moths" for the Royal New Zealand Air Force and the Empire Air Training Scheme have been produced at the de Havilland factory at Rongotai aerodrome, Wellington, New Zealand. In addition to turning out these sturdy biplane trainers the factory has been enlarged to produce component parts for Airspeed "Oxford" trainers for the R.N.Z.A.F.

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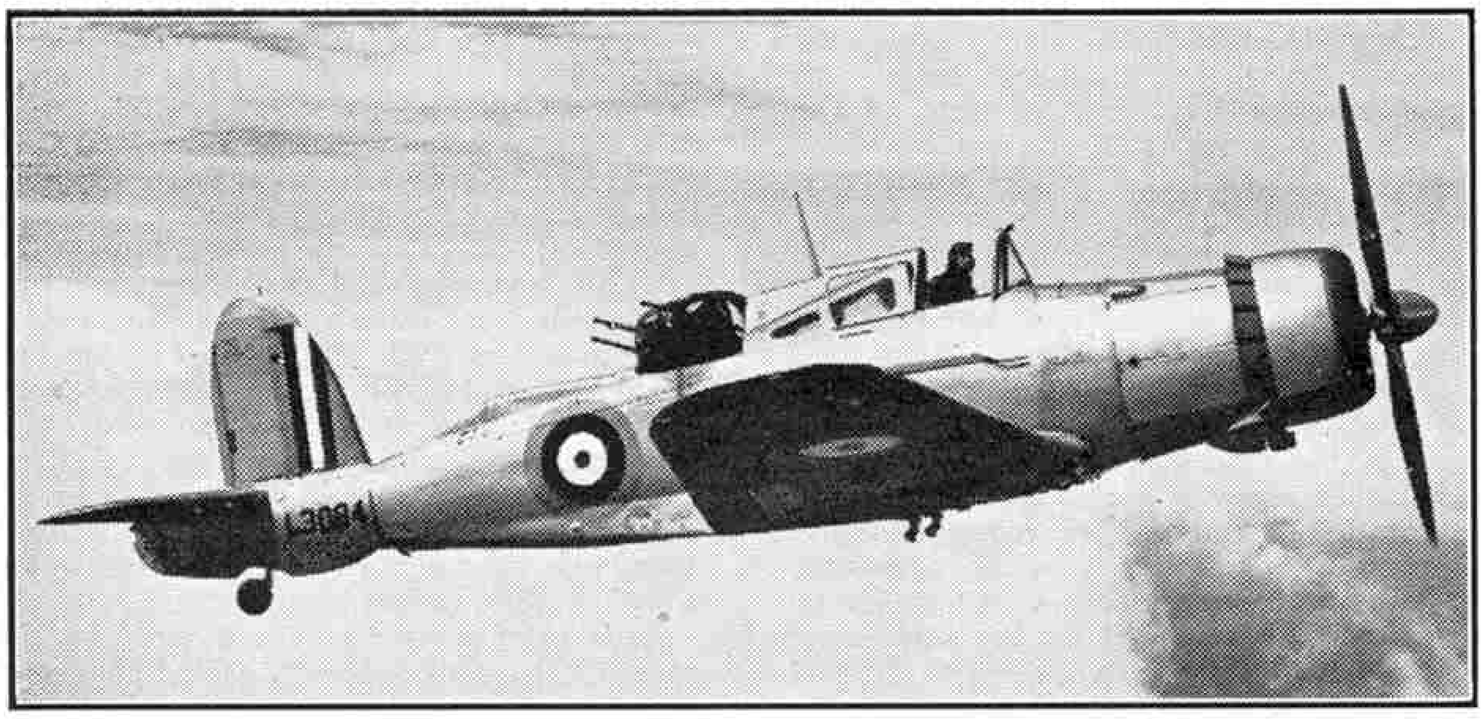
Aircraft are being employed by the Portuguese sardine fishing industry for locating shoals of the fish, the positions of which are reported by radio to the trawlers.

"Stop Me" Tricycles at R.A.F. Fighter Stations

Some hundreds of *"Stop me and buy one"* tricycles loaned by a well-known firm to the R.A.F. Comforts Committee are in use at R.A.F. fighter stations. They are pedalled round the dispersal points by airmen, and carry free hot and cold drinks to pilots who land during patrol for their "Spitfires" and "Hurricanes" to be serviced with petrol and oil. In place of the familiar pre-war slogan mentioned at the beginning of this note the tricycles now bear the words *"Stop me and have one!"*



The Blackburn "Roc," a two-seater fighter designed specially to meet the needs of the Fleet Air Arm. It has a Boulton-Paul 4-gun power operated turret. Photograph by courtesy of Blackburn Aircraft Ltd.

"Flying Wing" in Africa

A Cunliffe-Owen OA-1 "Flying Wing" monoplane has been delivered to the Free French Forces in French Equatorial Africa, who will use it for transport duties. It was flown there by J. A. Mollison, the well-known airman, who had an uneventful trip, although the route he followed was within the range of enemy patrolling aircraft.

The "Flying Wing" differs from the ordinary transport aeroplane by accommodating its passengers and freight in a specially deep wing centre section, thus dispensing with the usual long fuselage. An article on this interesting air liner was published in the February 1941 *"M.M."*

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Another compliment has been paid to the Vickers "Wellington" bomber. A machine of this type has been flown to the United States to show the American aircraft industry the design and armament of a British bomber type that is playing an active and very successful part in the war.

Goodyear Airships for Ocean Patrol

Little has been heard in recent years of airship development, but news comes from the United States of six airships under construction by the Goodyear Zeppelin Corporation, at a total cost of just over £400,000. They are said to be for ocean patrol. They will be equipped with machine guns and will carry depth charges and bombs, and have enough fuel to enable them to fly 2,000 miles non-stop. It is expected that they will be capable of a speed of 80 m.p.h.

"Kittyhawk" Fighters for the Royal Air Force

The "Kittyhawk," a new Curtiss fighter, is in production for the Royal Air Force and, as the "P-40D," also for the U.S. Army Air Corps. It is a development of the well-known Curtiss "Tomahawk" which, with a previous version called the "Mohawk," is in service with the R.A.F. The armament of the new fighter is not disclosed, but the fire power is reported to be 25 per cent. greater than that of the "Tomahawk."

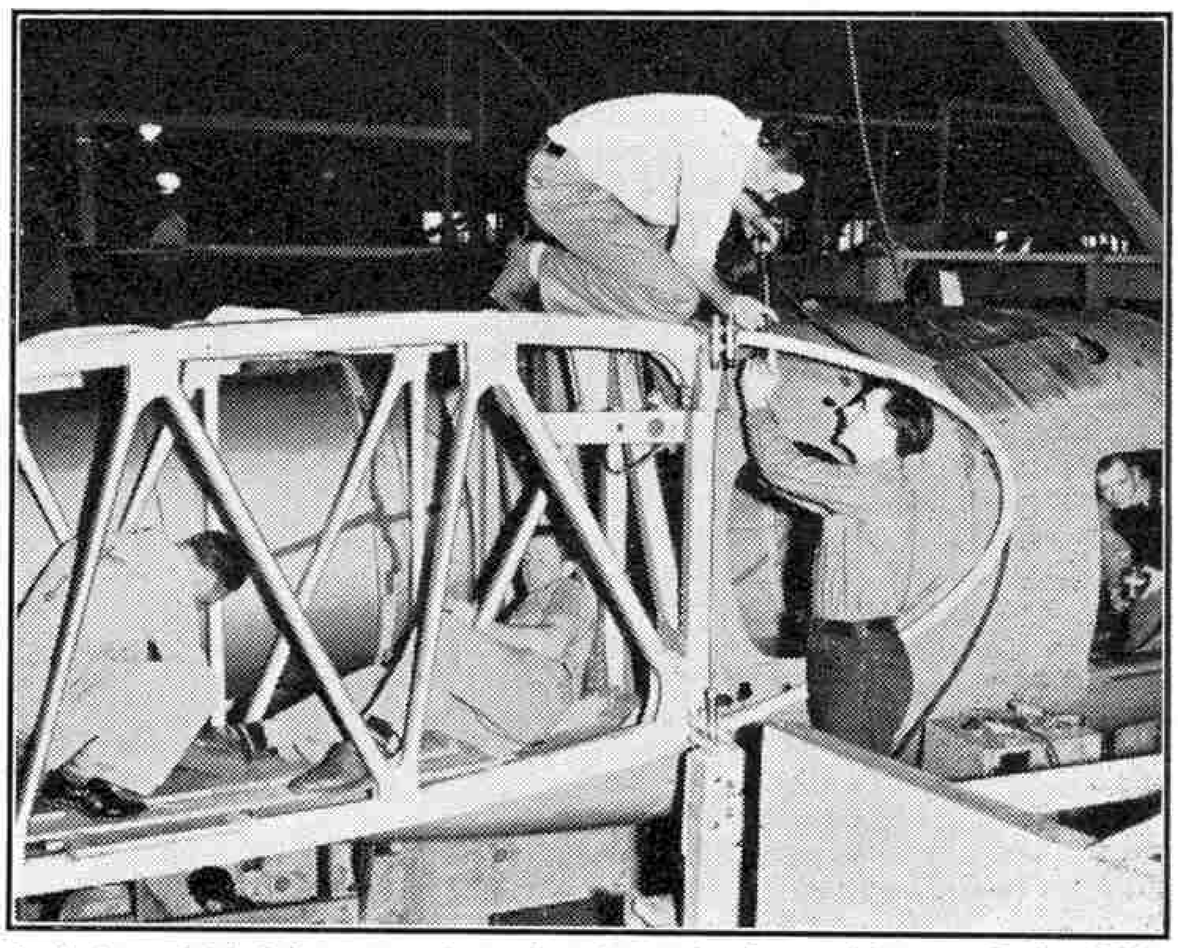
The "Kittyhawk" is fitted with the latest type Allison V-1710 engine, which develops 1,325 h.p. for take-off, and although no performance figures are available it is believed to have a top speed of about 380 m.p.h.

Oxygen Equipment on American Air Liners

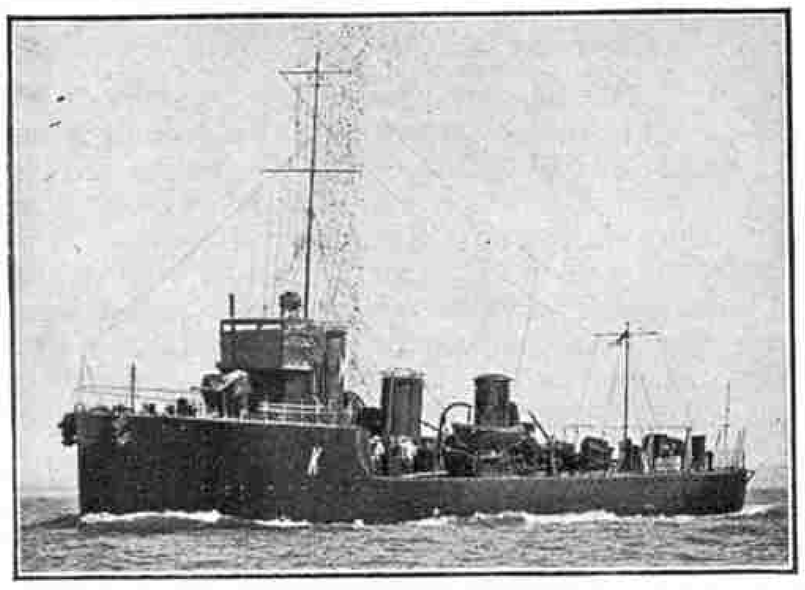
The Civil Aeronautics Board in the United States have made it compulsory for all air liners on regular air services in that country to carry satisfactory oxygen apparatus and supplies of oxygen if they operate higher than 10,000 ft. for more than 30 min., or above 12,000 ft. for any period.

* * * *

A transformer weighing 502 lb. and measuring 25 in. × 30 in. × 37 in. was recently conveyed by air from Toronto to Dawson City. It was flown as far as Edmonton in a transport aeroplane of Trans-Canada Air Lines, and there transferred to a machine of Yukon Southern Airways for the remainder of the journey, and reached Dawson City within 36 hrs. of leaving Toronto.



A riveter and his helper at work on the wing stub of one of the new Boeing 314A "Clipper" flying boats. The two men inside the structure are installing a fuel tank. Photograph by courtesy of the Boeing Aircraft Company, U.S.A.



How a Warship's Speed is Measured

By Ex-Instructor Claude White

THE war has turned the eyes of the world upon the ships of the British Navy.

It is a matter of interest to many of us to know something of the speed of our ships and how this is measured. At the start of their career all men-of-war undergo full speed trials over a measured distance. While undergoing these trials they fly at the masthead the International code flag A to warn shipping off the course. This is a white burgee with a blue fly, and corresponds with the Naval Code flag U.

The speed is measured in "knots," which is the common term for one nautical mile per hour, a nautical mile being 6,080 ft. as distinct from a land mile of 5,280 ft. To use the phrase "knots per hour" is incorrect, a redundancy. The probable origin of the term "knot" is in itself interesting. In the early days the calculation of a ship's speed was always a difficulty and various crude methods were adopted to achieve any sort of result at all. The best known method consisted in knotting a rope at regular intervals and fitting it with a float at one end. This end was then dropped over the stern and the rope allowed to run through the fingers. The number of knots that passed in a given time, measured by means of a sand glass, enabled the mariner to form some approximate idea of his speed. This method could also be used at night when the knots were "felt" as they ran out.

All readers who have made any kind of long sea voyage are familiar with the ordinary type of patent log, secured aft, fitted with a registering apparatus, a rotator and a wheel governor. The rotator is shaped like an elongated propeller and is towed at a rope's end, called the log line, which in its turn is fixed to the wheel governor, the familiar wheel seen near the taffrail, which gives steadiness and smoothness of working to the registering apparatus. This wheel governor is finally attached to the log itself by means of a short length of rope.

The accuracy of the patent logs depends largely upon the length of line used, and this varies with different vessels. It is necessary to make experiments for any particular vessel. For normal vessels this length varies from 40 fathoms of line at a maximum speed of 10 knots to 125 fathoms at a speed of 25 knots. When the correct length is found it is never altered. It is better to use too long a line than one too short, as the rotator will be deeper in the water and the log will be less affected by rough weather.

These logs also have their errors, which are found and recorded as a percentage of the distance actually run. The errors may be found in two ways—the first from a run between two points at a known distance apart, due allowance being allowed for tides; the second from runs over a measured distance both with and against the tide, the mean of the *speeds* being employed and not the mean of the times. The latter method is preferred.

A later type of log incorporates an electrical make-and-break apparatus that sends out an electrical impulse at every $\frac{1}{10}$th mile to a register on the bridge. This enables the officer on watch to read the log from the bridge instead of sending a man aft to do so.

Another recent log and speed indicator, actuated on a different principle, has many advantages, the chief of which are—one, registration of speeds as low as four knots; two, it is not damaged by the ship going astern nor does it interfere with towing operations; three, it cannot be choked by floating weed, etc.; and four, any variation of speed due to increased slip of the ship's propellers can be immediately observed and allowed for. The last point is of great importance in turbine-driven vessels.

A brief description of this log will be of interest. It consists of a hollow metal tube projecting about 15 in. from the ship's bottom at a point coinciding as nearly as possible with the ship's "pivot point," which is about a third of the distance from bow to stern. An opening is made in a fore-and-aft direction near the lower end of the tube, to allow the water to enter and leave as the tube is carried forward by the ship. Between these two openings is a small propeller operating the transmitting mechanism, and designed so as to make a certain number of definite revolutions while the ship travels one sea mile. The whole of the tube can be drawn up into the interior of the ship for repairs and adjustment when required.

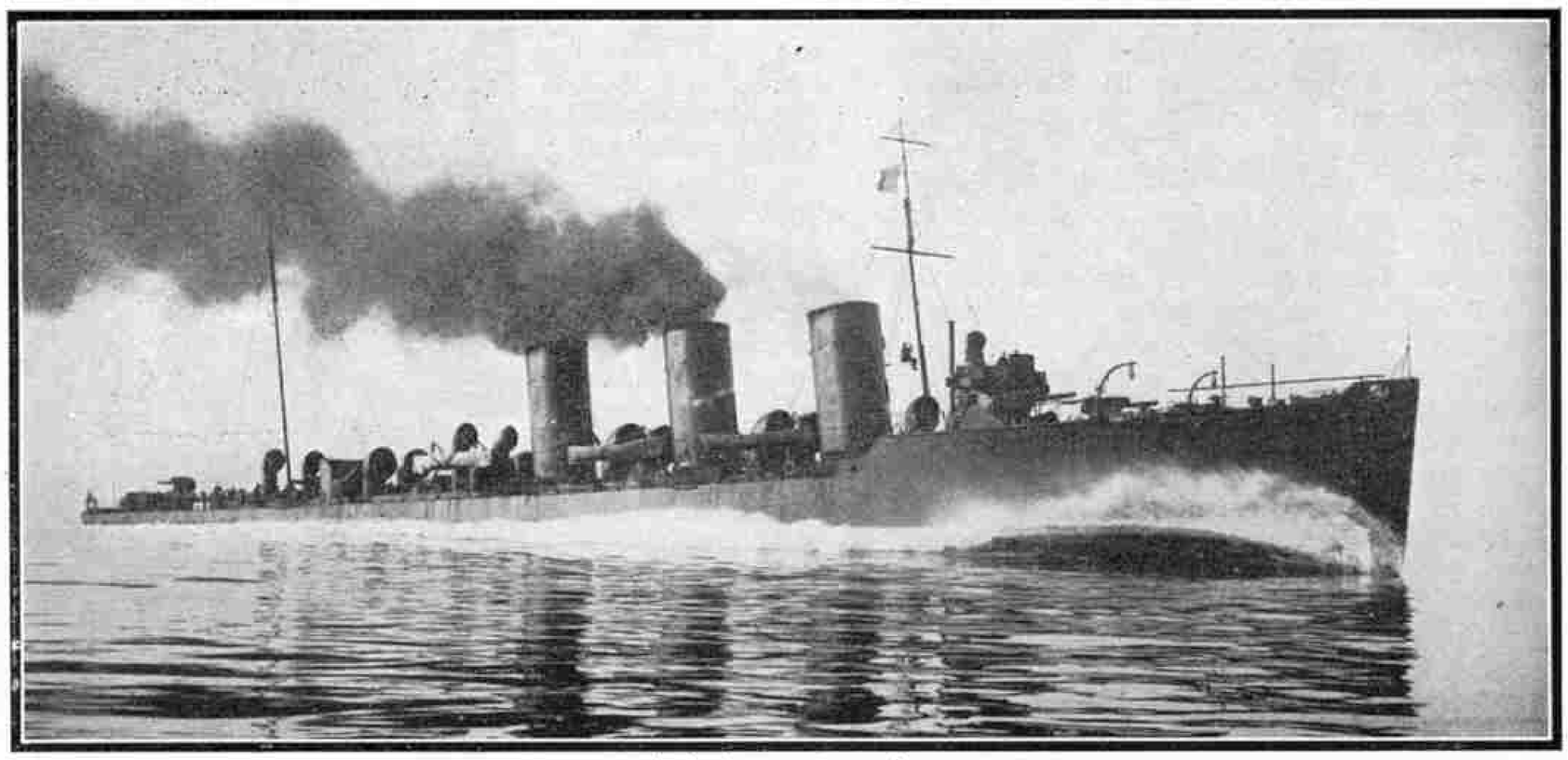
At the top of the tube are fixed a commutator that transmits 100 electrical signals to a distance recorder while the ship travels one sea mile, and a magneto generator that generates a current proportional to the speed at which it revolves. This current is led to one or more voltmeters having the scale marked in knots, and thus acting as speed indicators. Any number of distance recorders and graduated voltmeters can be fitted in various parts of the ship, and by their means the total distance travelled and the speed of the ship at any instant can be observed.

It must be remembered that the revolution of the engines gives at least as reliable an indication of the speed of a large ship as any patent log, providing weather conditions are moderate and the ship's bottom is not foul. Revolution tables are always compiled for a ship with a clean bottom. This being the case we have revolution indicators on the bridge and in the engine room, in just the same way as we have the well-known engine room telegraph that signals to the engine room the Captain's orders.

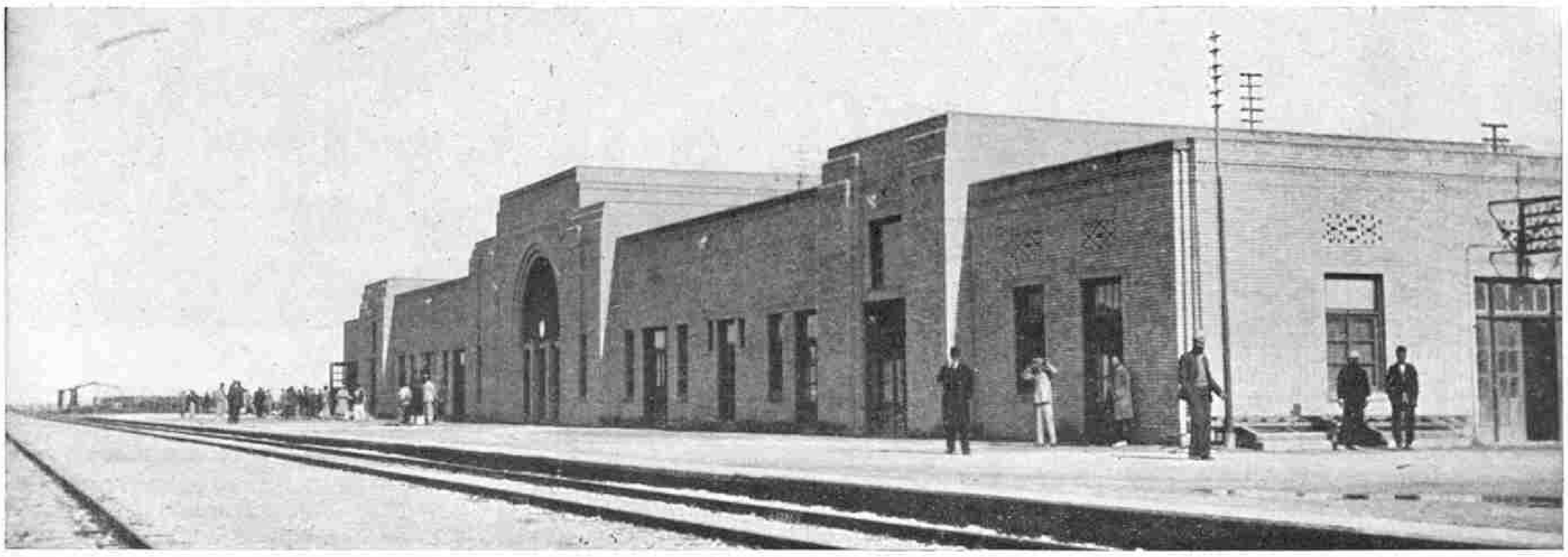
This brief survey of the subject by no means exhausts its possibilities; but it will give some idea of the ingenious way in which ship designers have met the problem.

When the layman visits "his Navy" on some occasion when H.M. ships are thrown open to the public, he is invariably interested in what appears to be a huge clock placed well up in the after part of most men-of-war. The purport of this great dial is to indicate the ship's speed to the ship immediately astern when the formation is single line ahead. When the fleet is manœuvring in this formation it is essential for all ships to be travelling at the same speed to avoid running into each other. The fear of collision in these circumstances is the favourite nightmare of every young lieutenant with his first command, especially when his ship is of the speedy destroyer class. Another feature worthy of notice is the sockets at the side of the bridge to take flags indicating the speed when in close formation. We cannot now go further into the subject of manœuvres and the relation of speed thereto. This relation is very definite, the formation arrived at depending almost entirely upon the speed of the various units.

Next time you see a man-of-war tearing through the water with the International Code flag A at the masthead you will know that she is undergoing her full speed trials.



A destroyer at speed.



Modern stations, such as this at Ahwaz, are a feature of the Trans-Iranian Railway. It has circulating hall, waiting rooms and the usual offices. The illustrations to this article are by courtesy of "The Railway Gazette."

Building the Trans-Iranian Railway

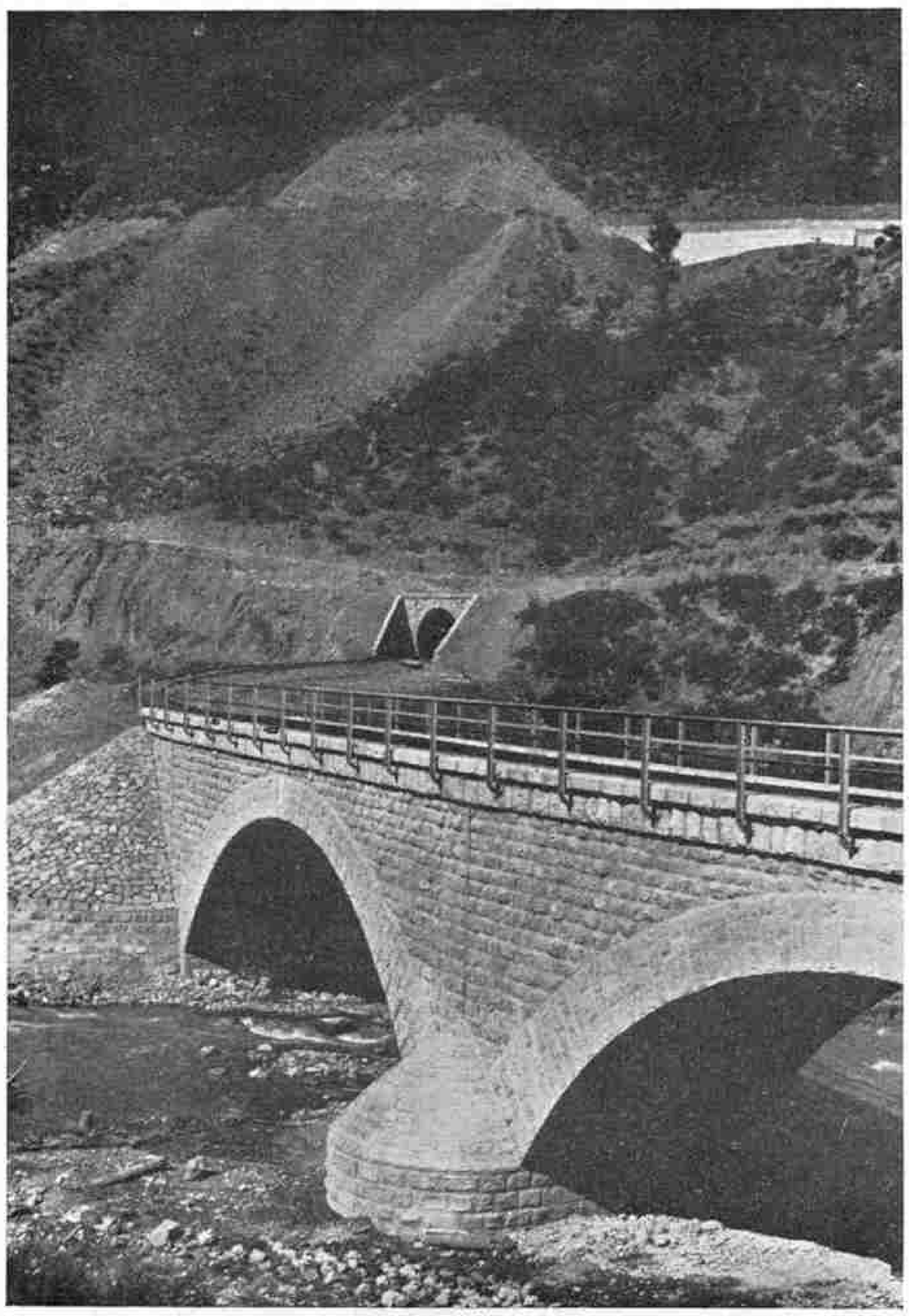
By E. R. Yarham, F.R.G.S.

RECENT events in Iran, as the age-old land of Persia is now called, have brought that country into prominence. Particular importance is invested in the Trans-Iranian Railway system, for this links Bandar Shapur at the head of the Persian Gulf with Bandar Shah on the shores of the Caspian Sea. No doubt control of this strategic line would ultimately have followed the Nazi "infiltration" of the present War but for the recent intervention of Britain and Russia.

It has been said that the Trans-Iranian "was probably the last great railway that would ever be built." It is of special interest on that account, but in any case it was a tremendous engineering project. Once again British engineers triumphed, for they were engaged in the construction of the most difficult section of all, that through the mountain mass of Luristan, 120 miles wide. On this section there are 13 tunnels penetrating a 6,000 ft. high barrier of solid rock, and the longest tunnel is two miles. Before these could be thrust through the mountains, however, 25 miles of roads had to be made through wild and desolate country, and many bridges built to get men and material to the scene of operations. The eleven British engineers had to fight bandits, who on occasion killed a cashier and three bodyguards and got away with £2,000.

The total length of the line is approximately 865 miles, and one can grasp something of the nearly insuperable barriers the engineers have had to face from the fact that in one 38-mile section alone there are 150 tunnels. At the peak period of construction between 40,000 and 50,000 men were employed.

The first steps towards the enterprise were taken in 1926 when two American engineers surveyed the proposed route. In 1927, work was started from both the northern and southern ends of the line towards the capital Teheran. By 1933 some 240 miles of line had been built, and subsequently under the control of a Danish syndicate appointed by the Iranian Railway Ministry rapid progress was made. From the northern end the line passes through the Elburz Range where a height of nearly 7,000 ft. is negotiated by means of spiral tunnels and numerous bridges, the ruling gradient over this section being 1 in 36. It is on this section, the Savad-Kuh incline, that the bridge shown in the lower illustration on this page is located. The tunnel mouth shown leads to one of the spirals referred to. At Gaduk the summit pass is pierced by a tunnel nearly two miles long, and the descent to the central plateau is less abrupt through the valley of Havlahrud. Subsequently desert country is traversed southward to Teheran.

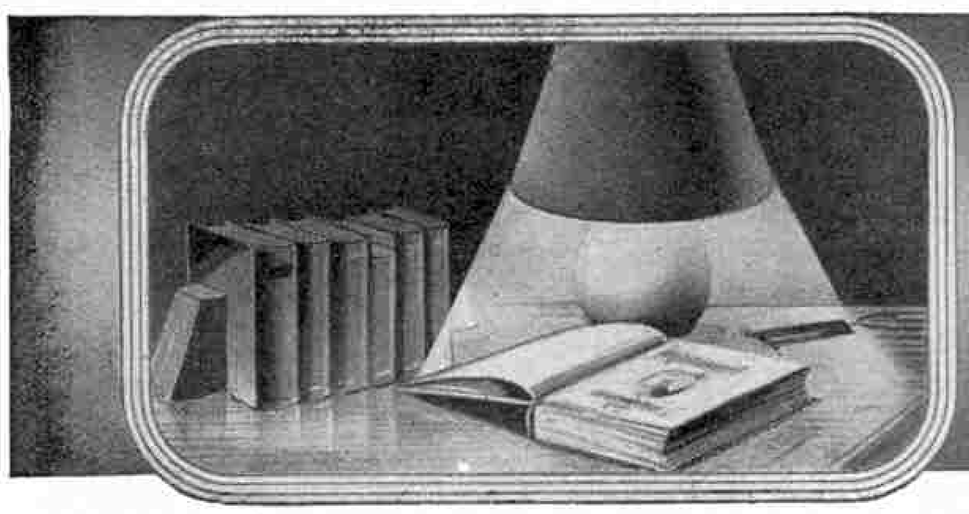


A masonry bridge on the 1 in 36 northern section of the Trans-Iranian Railway. The tunnel mouth leads to a spiral layout by which the mountainside is negotiated. In the upper right-hand corner a further section of the line can be discerned.

On the southern section the line runs from Bandar Shapur across the plains of Khizistan, and then at Dizful come the Zagros Mountains, this being the location of the difficult contract carried out by British engineers. The gradients on this southern section are easier, 1 in 67 being the ruling grade. About Bahrein the alignment is generally more favourable.

The railway was completed and opened throughout in 1938. Previous to this however both sections of the line had been in use, and coal-burning 2–8–0 locomotives were placed in service in 1934 on the northern section, similar but oil-burning engines being used on the southern section. These were built in England and were supplemented by a series of 2–8–2s built in Sweden. For the 1 in 36 section in the Elburz Mountains powerful articulated Beyer-Garratts of the 4–8–2; 2–8–4 type are in use.

During construction about 10,000 tons of cement was used monthly for bridges, tunnel linings, etc.



BOOKS to READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/- for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"Thirty Fathoms Deep"

By Commander Edward Ellsberg
(Harrap. 5/- net)

The *"Santa Cruz"* lay 30 fathoms deep a league away from El Morro Island, off the coast of Peru. She had been scuttled there 300 years ago after a desperate attempt to run into shoal water to escape Drake in the *"Golden Hind,"* and deep in the sand and mud was still full of jewels and bars of gold. Bob Porter discovers this from an old Spanish book that he picked up in New York and longs to try to recover the treasure. A rich uncle is persuaded to supply the necessary funds, and very soon Bob sails out to El Morro in the *"Lapwing"* a modern salvage ship, with a crew of divers, sailors and fighting men. There are thrilling adventures in the depths, into which Bob Porter himself penetrates along with the seasoned divers of his crew as they search the sea to recover the treasure. The news of their venture had leaked out through a treacherous seaman, however, and a pirate crew comes along to take the salvaged treasure from them. There is a fierce fight, and how Bob Porter, who was below the sea at the time, puts a speedy end to the desperate effort is well told in a stirring climax to a fine story.

The book is enthralling apart from its outstanding merits as a story of adventure, for its author is an experienced diver, to whose skill the raising of the sunken American submarines S-51 and S-4 was due. The reader realises something of the dangers and difficulties of work at great depths in the seas, for many of the hair-raising experiences that divers meet in action are woven into the tale. Life-lines are cut and supply pipes severed as divers crawl in the darkness through narrow openings leading into the interior of the wreck, and death threatens the men from "bends," the dread of all divers, when they have to be hauled up suddenly from the depths owing to accidents and so cannot adjust themselves to the rapid changes in pressure. Most of the action takes place in this undersea world and is fascinatingly dealt with.

There are five full page illustrations.

"The Revolution in Physics"

By Ernst Zimmer
(The Scientific Book Club. 2/6)

This splendid book, which was reviewed in the *"M.M."* for March 1936, is now made available for members of the Scientific Book Club. It is not a book for our younger readers, but it will appeal strongly to those who already have some knowledge of the scientific picture of the world and wish to learn of the startling developments of more recent times.

It is not very long since the world was looked upon as an assemblage of atoms of different kinds, combined in various complicated ways. The discovery that the atoms themselves are built up of several kinds of minute particles was a startling one, and further sensations have followed our probing into these, with the result that the old-fashioned picture is now completely out of date. The electrons and other mysterious particles appear to masquerade sometimes as matter and at other times as waves, and it has been realised that there is an essential lack of certainty in our measurements of their size and speed. This and many other mysteries of modern science are attractively dealt with, including such matters as radioactivity, cosmic rays and relativity, culminating in the revelation that we must penetrate into new dimensions to find reality. Every page of the book is full of the deepest interest, and the author's story fully justifies his startling title.

Owing to difficulties that have arisen as the result of war conditions it is impossible to guarantee the immediate delivery of books ordered in accordance with the scheme explained a the head of the first column on this page. For this reason readers who order books must be prepared for some delay, but every effort will be made to ensure speedy despatch.

"Information Received"

By Robert Harding

"The Bull Patrol"

By Arthur Catherall
(Lutterworth Press. Each 6d. net)

These are attractive yarns included in the Junior Wren series. Mr. Harding needs no introduction to readers, for his stories of adventure on the North West Frontier of India and elsewhere in the East are well known to readers, and the four yarns included in this volume are up to his usual standard. The first tells the story of a dangerous rising among the warlike natives of the Frontier, which is nipped in the bud by a Secret Service Official who ventures in disguise into the bandits' stronghold. An exciting river patrol in Mesopotamia and a Temple of Vultures with a gorgeously jewelled idol in it figure in others.

The scene of *"The Bull Patrol"* is set in England, and the story is that of a group of Scouts who thwart sheep robbers, rescue a shipwrecked sailor in a storm and fight for their lives in underground pit workings through which flood waters are released, among other exciting and unusual adventures. The whole makes up a very thrilling story.

"The Social Life of Animals"

By W. C. Allee
(The Scientific Book Club. 2/6)

We are all familiar with the manner in which certain creatures live together in more or less organised communities, termites and ants providing the examples that are best known to us. To most readers it will be a revelation to find that many other living creatures form regular groups that are organised in some way. This is the subject of Professor Allee's fascinating book, which brings to light social life and tendencies throughout the entire animal kingdom, beginning with midges, ladybirds and microscopic water animals that congregate together and reaching its climax in man and insects.

It is not necessary to be a biologist to appreciate the author's story, for it is brilliantly written and at times is even amusing. For instance, we find that chickens appear to develop an organisation that is reminiscent of Fascism, with a leader or dictator who is almost invariably at the apex of the flock when it goes pecking in fields or orchards. Pigeons, canaries and parakeets seem to be more democratic. The author shows how these and other social organisations among animals remind one constantly of human communities, and he gives fascinating stories of the patient experiments that have been made with creatures of all kinds that have revealed these resemblances. Birds, mice and even goldfish have been used in these astonishing experiments, and for further variety we have the Dionne quintuplets, who in their somewhat isolated existence gave evidence at an early age of a social organisation among themselves. A section of particular interest at the present time disposes of the belief that war brings any social or racial benefit with it.

The book is one that our older readers will find intensely interesting, both for its theme and for the fascinating examples of animal organisations that are fully worked out in it with the aid of drawings and diagrams.

"Engineering Workshop Manual"

By E. Pull (Technical Press. 4/- net)

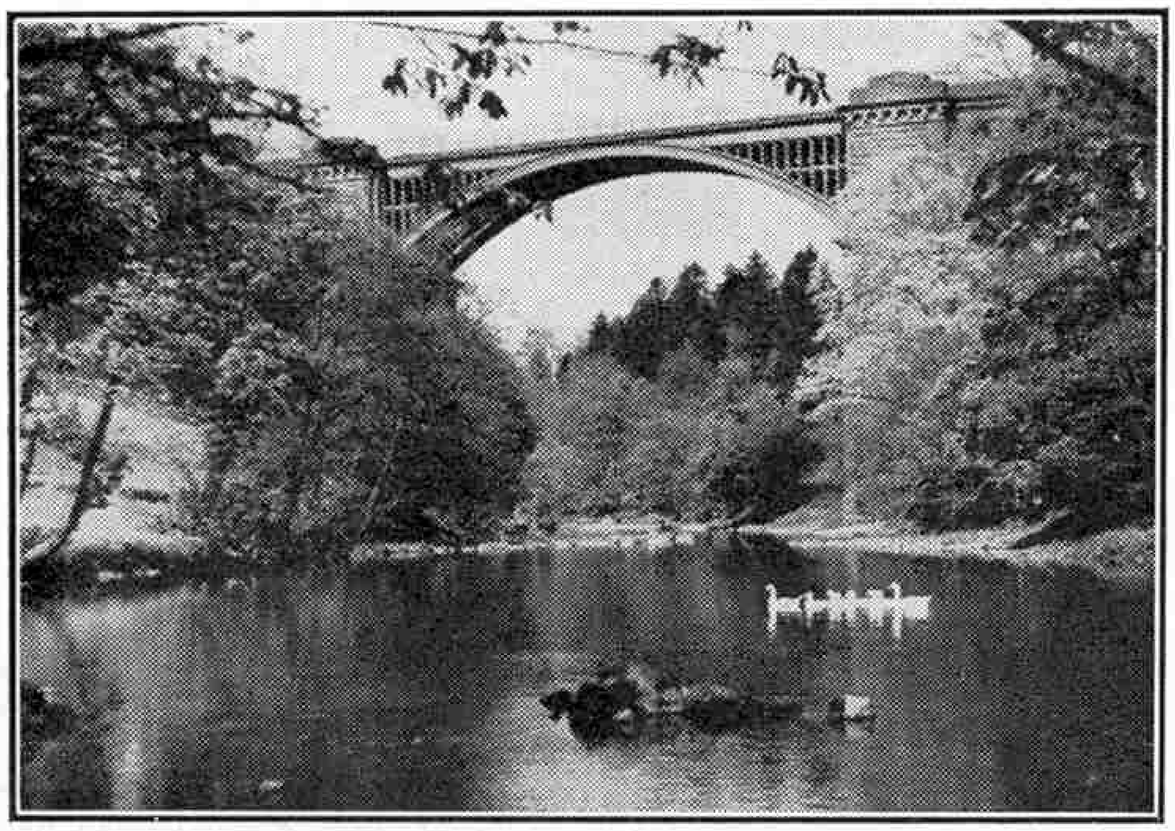
This well-known work has now reached its 8th edition, sure evidence of its real practical value to the engineer and engineering student. It has again been considerably enlarged, and now contains valuable sections on soldering and brazing, the properties and machining of light alloys, and the transmission of power, and also many additional tables. The book is particularly useful to munition workers and those making a start in the engineering workshop. With its guidance they will carry on their work with confidence, and it is not surprising that many large engineering firms are now using the book as a basis for training. There are 195 illustrations.

Photography

Toning, Trimming and Mounting Prints

IN last month's "*M.M.*" we dealt with the making of prints on gaslight paper, and this month we come to various simple processes by which the appearance and interest of the prints can be greatly improved.

An advantage of prints on gaslight paper is that they can be toned or stained to a variety of colours. When developed, fixed and washed in the usual manner the prints give black and white pictures. For many subjects these are perfectly satisfactory, but there are certain subjects such as



"The Viaduct," an attractive picture by J. S. Mount, Sedbergh.

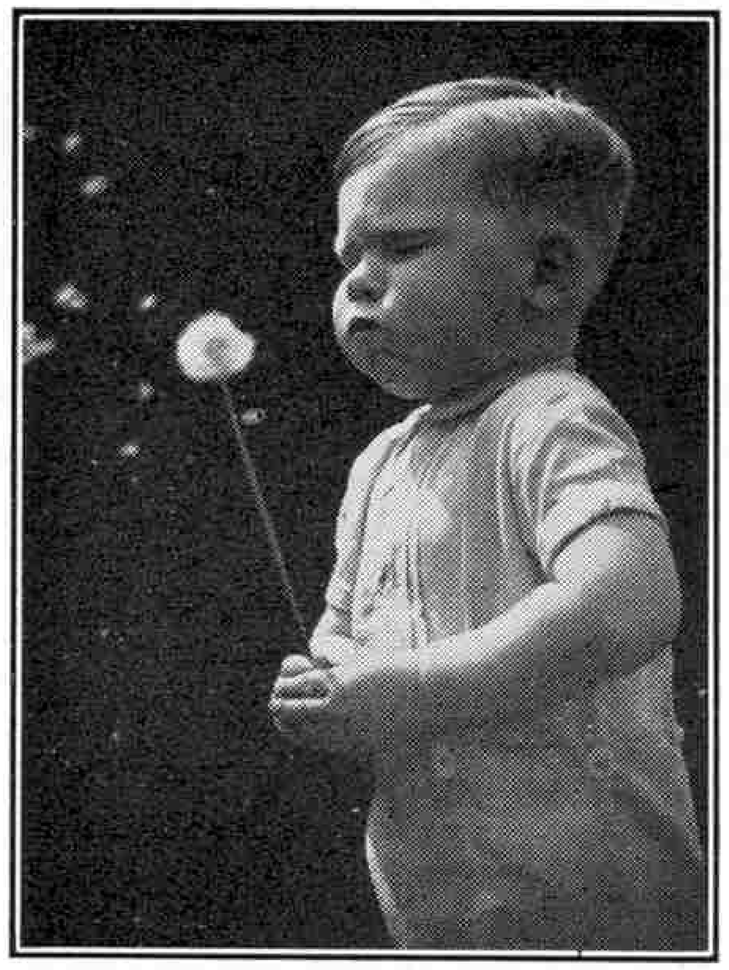
wood scenes, seascapes, clouds and sunsets, old cottages and other ancient buildings, that are improved by toning the prints to suitable shades of brown, green, blue or red. Readers who have never tried these processes are strongly advised to make the experiment. They are quite simple to carry out and consist simply of immersing the prints in special solutions. These can be obtained from any photographic dealer, together with full instructions for their use. Seascapes look very effective stained blue or green, and evening landscape scenes look particularly well if stained to a pale yellow.

No darkroom is required for any operation of toning; all the work can be done in a white light. The secret of obtaining perfect results is to have a good black and white print that has been properly fixed and thoroughly washed.

Most prints are all the better for a little careful trimming. A useful "gadget" to assist one in determining what parts to trim away consists of two L-shaped pieces of cardboard, the legs of which are about 1 in. wide. These are arranged on the print to form a rectangle and moved about until they "frame" the most pleasing picture. The unwanted parts of the prints are then cut away with a sharp penknife and a steel rule, or with one of the special trimming devices sold for the purpose.

As soon as the prints are ready they should be mounted in an album. If they are left lying about loose or carried in the pocket in an envelope they soon become dirty and crumpled. Albums are of two kinds, "slip in" and "paste on." The former are the easier to fill, but as the prints must all be of standard sizes and shapes they are not suitable for trimmed prints. The paste-on type allows the photographer to trim his prints as desired.

For mounting prints it is best to use one of the ready-made mountants to be bought from any photographic dealer. The print is placed face downward on a sheet of newspaper and the mountant spread over its back with the finger tip. Every portion of the print should be covered thinly and evenly, care being taken not to leave any excess mountant at the edges. The print is then placed in position on the

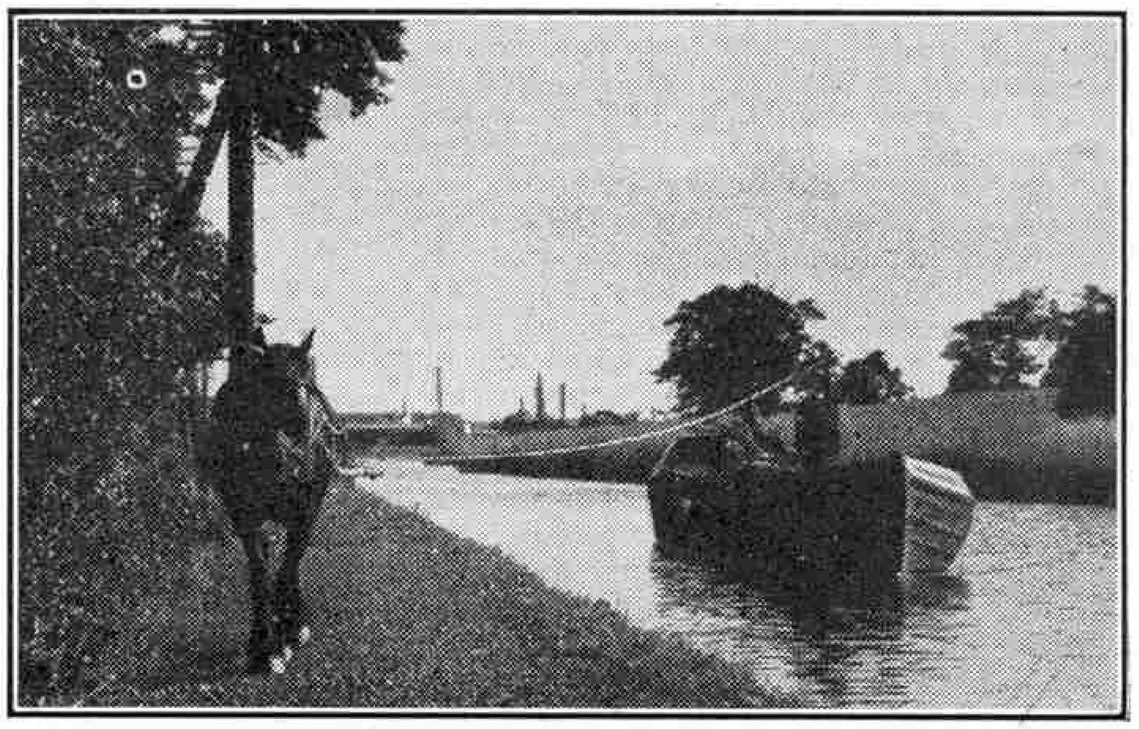


"One-o-clock, two-o-clock . . . ." This amusing study is the work of G. Gemmill, Burnley.

page of the album and pressed firmly into contact with a piece of blotting paper. Any mountant that has oozed out at the edges of the print should be wiped off immediately with a clean rag. When all the prints that are to be mounted at the time are finished, the album should be placed under light pressure such as that of a few books, and should remain undisturbed for several hours.

Care should be taken to see that the cover of the bottle or jar of mountant is screwed up tightly after use.

A title, however short, should be written underneath each print, giving at least the place and the date concerned. Special white writing ink can be bought for this purpose, and it looks well on grey or dark album leaves. The writing should be small and as neat as possible. An alternative method is to give each print a reference number, and write or type the details on a sheet or sheets fixed at the back of the album.



"Canal Transport." W. Barr, Birkenhead, is the author of this picture.

RAILWAY NEWS

Express Running in East Anglia

Despite decelerated schedules there is still considerable interest attaching to locomotive performance on the Great Eastern Section of the L.N.E.R. in East Anglia, particularly where fairly short start-to-stop runs are involved. These call for greater effort than the longer non-stop runs, which in the main are very slackly timed. The fair variety of locomotive types employed in this area also makes for interest in performance. Among examples of smart runs of short duration, the streamlined "Sandringham" 4–6–0 No. 2859 *"East Anglian,"* hauling an 11-coach train of 350 tons tare on a down express from Liverpool Street, covered the 9.5 miles from Shenfield to Chelmsford in 11½ min., maximum speed 72 m.p.h.; the 8.0 miles Witham to Marks Tey in 11¼ min., maximum 58 m.p.h., and the 17 sharply undulating miles from Colchester to Ipswich in under 22 min. All these times are start-to-stop.

Coming south from Norwich, "Sandringham" No. 2844 *"Earlham Hall"* with a seven-coach train of 230 tons covered the 5.5 miles Tivetshall to Diss in 7 min. 40 sec., maximum 72 m.p.h., and the 14.4 miles from Diss to Stowmarket in 17¼ min., maximum 65 m.p.h. With an eight-coach load of 237 tons, inside-cylinder 4–6–0 No. 8515 ran the 46.3 miles from Norwich to Ipswich in exactly the 57 min. allowed, maximum 68 m.p.h., but with two severe p.w. slacks net time was not more than 53 min.

Quite a good run with an 11-coach train of 327/350 tons was noted on the Cambridge line behind No. 2865 *"Leicester City,"* which like a number of other "Sandringhams" now in East Anglia was formerly on the Great Central Section. Starting sluggishly out of Bishop's Stortford, *"Leicester City"* worked up to 66 m.p.h. in Newport dip, fell to 55 on the short 1 in 130 up to Audley End, and then maintained between 64 and 68 m.p.h. into Cambridge, which was reached in 31½ min. for 25.3 miles, a gain of 2½ min. The dead level stretch of 14.7 miles between Cambridge and Ely witnesses curious inequalities of running; for instance, rebuilt *"Claud Hamilton"* 4–4–0 with 327/350 tons took 21 min. start-to-stop, without exceeding 53 m.p.h. whereas No. 2841 *"Gayton Hall"* with a similar load took 2 min. less, with a top speed of 64 m.p.h.

Finally there may be mentioned a run with ex-G.E. 4–4–0 No. 8808, hauling a substantial load of 360/380 tons, 14 vehicles, when the 14.7 miles Thetford to Attleborough were run in 20½ min., including a p.w. slack (maximum 62 m.p.h. and the 9.2 miles from Wymondham to Norwich (Trowse) in 14 min., also including a severe permanent way slack, with a maximum of 68 m.p.h.

D. S. Barrie.

Centenary of Irish Locomotive Building

The short Dublin and Kingstown Railway, the first in Ireland, was opened in 1834. Its initial locomotives came from England, but just 100 years ago the first Irish-built engine was put into traffic. It was a 2–2–2 "single-wheeler" tank of modest dimensions, weighing only 18 tons in working order and named *"Princess."*

This pioneer locomotive was constructed at Grand Canal Street Works, Dublin, which were in use until the formation of the Great Southern group in 1925. The original line on being extended passed into the hands of the Dublin and Wicklow Company in 1856, and soon after this line was converted from the British 4 ft. 8½ in. gauge to the wider Irish standard of 5 ft. 3 in. The Dublin, Wicklow and Wexford system, as it was known later, afterwards became the Dublin and South Eastern, which was finally merged into the Great Southern, the principal amalgamated main line of Eire to-day.

Kingstown, now called Dun Laoghaire, is the mail and passenger port of Dublin, from which vessels sailed twice daily to Holyhead in normal times. A considerable suburban service is operated through the town station to Bray and Greystones.

* * * *

In the "Railway News" pages of our September issue it was stated that Nos. 5946 *"Duke of Connaught"* and 6017 *"Breadalbane"* were the two last remaining "Claughtons." We are now informed that No. 6004 and No. 6023 *"Sir Charles Cust"* actually are the two last in service.

The weight of the American narrow gauge locomotive illustrated on page 297 of our last issue was inadvertently given as 400 tons! This should have been 40 tons.

Eight-Coupled Locomotives for New York Central Railroad

Fifty engines with the 4–8–2 wheel arrangement have recently been placed in service by the New York Central Railroad for heavy passenger as well as freight services. Extensive use has been made of light weight steel alloys in the construction of motion, driving axles, etc., but their total weight is of formidable proportions, as they are big and very powerful locomotives. The outside cylinders are 25½ in. diameter with a stroke of 30 in., the driving wheels are 5 ft. 9 in. in diameter, and the boiler measures 7 ft. 10 in. across. The pressure employed is 255 lb. per sq. in., and there is a heating surface of 4,676 sq. ft., with a superheater area of 2,103 sq. ft. in addition. The tender carries 15,500 galls. of water and 43 tons of fuel, weighing 136 tons when two-thirds full. The total weight of the engine alone is 176 tons, making a total of 312 tons.

Accelerated G.W.R. Timings

The current working timetables of the G.W.R. include an authorisation to express drivers to attain speeds up to a maximum of 75 m.p.h. on suitable stretches of line if necessary, and an instruction to work to accelerated point-to-point timings when their trains are running late. At the same time all speed restrictions, whether temporary or permanent, must be strictly observed where applicable.

The present wartime published start-to-stop bookings average about 47-48 m.p.h., and can usually be maintained without exceeding about 60 m.p.h. anywhere. The accelerated conditional working times require mean speeds of 53-55 m.p.h. over the more easily graded sections, and a general average of approximately 52 m.p.h. from point to point over both long and short distances.

Although the longest non-stop run at the present time is normally the 173½-mile journey between Paddington and Exeter performed by the up and down *"Cornish Riviera Expresses,"* on very busy days preceding public holidays the first section of the westbound train is still booked to run without a halt over the 226¾ miles from London to Devonport; the call there is made only to change engines, passengers being conveyed for Cornish destinations only. Two other relief services also were scheduled last August to run without a stop from Paddington to Torquay.

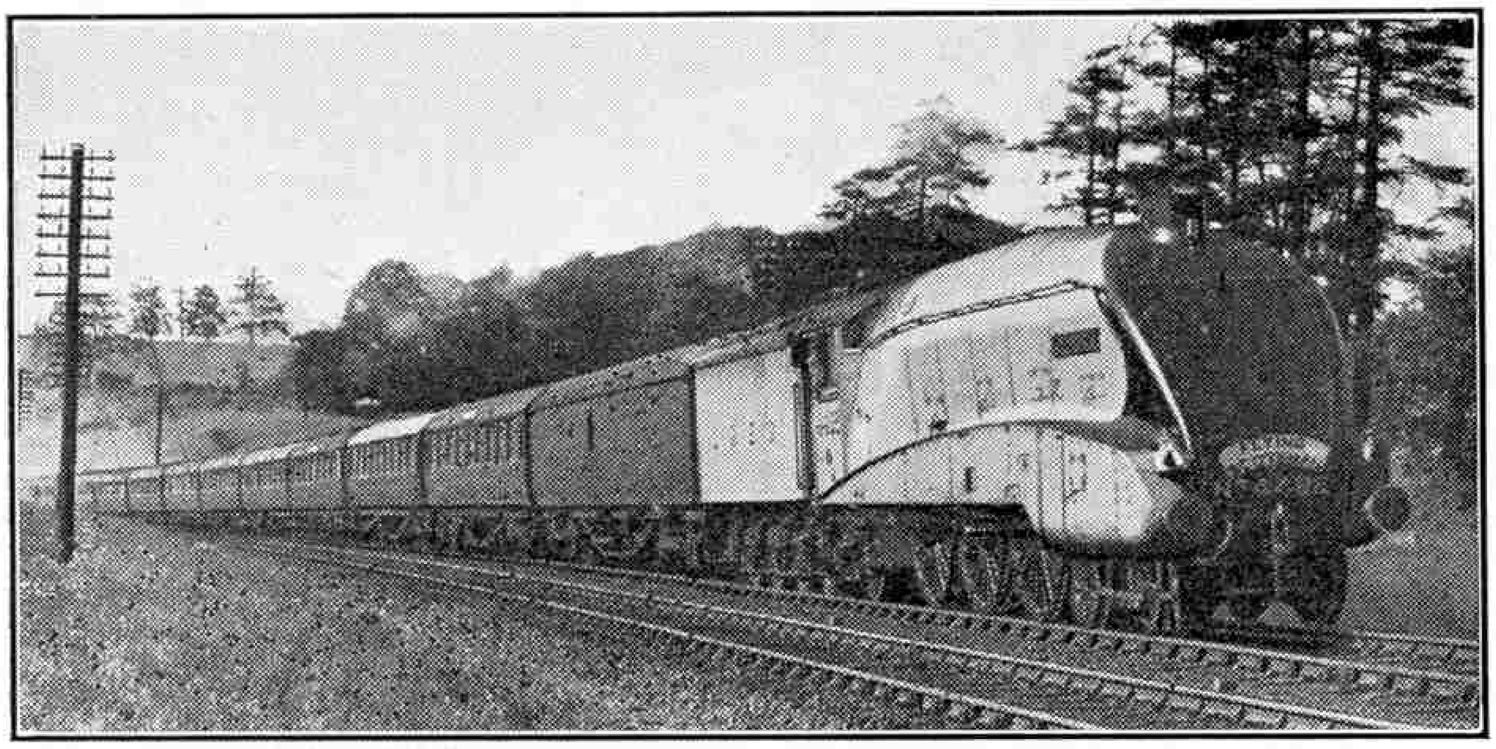
Liverpool-London express headed by 4-6-2 No. 6210 "Lady Patricia," one of the first series of L.M.S. "Pacifics."

Fine *"Flying Scotsman"* Running with Heavy Loads

The running of the wartime L.N.E.R. *"Flying Scotsman"* is providing considerable interest on account of enormous loads, although the train is run at least in duplicate daily.

On a recent northbound run from King's Cross, the first portion was hauled to Grantham by streamlined "Pacific" No. 4902 *"Seagull,"* which is fitted with the peacetime schedule of the midday and evening East Coast expresses and only four minutes less than the quickest pre-war stopping *"Flying Scotsman"* time. Start to stop the 29½ miles from Peterborough South to Grantham had occupied only 33 min.

On another occasion, between Newcastle and Edinburgh, with 19 coaches on, No. 4497 *"Golden Plover,"* fitted with standard "A4" jumper blast pipe, made up 8 min. between Newcastle and Berwick and 2 min.



The non-stop "Flying Scotsman" of 1939. The engine is No. 4482 "Golden Eagle."

Kylchap blast-pipe and double chimney. The tare weight was 546 tons, which meant about 590 tons gross behind the tender as the 17-coach train was very full.

A good start was made, New Barnet, 9.2 miles, being passed in 15¾ min., but the line was busy and a bad succession of signal stops on each side of Potter's Bar summit caused a loss of nearly 12 min. to Hatfield. There was a further slight check just after passing the top of the Woolmer Green bank, so that 46½ min. were occupied in getting past Knebworth, 25 miles from the start. The next 50 miles to Fletton Junction were covered in 46 min. by dint of maxima of 71½ m.p.h. beyond Hitchin and a sustained 73 down Abbots Ripton bank, the lowest speeds in between being 63½ over St. Neots "hump" and 55½ on the three-mile 1 in 200 ascent after Huntingdon. Peterborough would have been passed no more than 3½–4 min. late but, alas, another dead stand for signals of 2½ min. duration occurred outside, followed by further checks as the station was passed, so that nearly 4 min. more were lost.

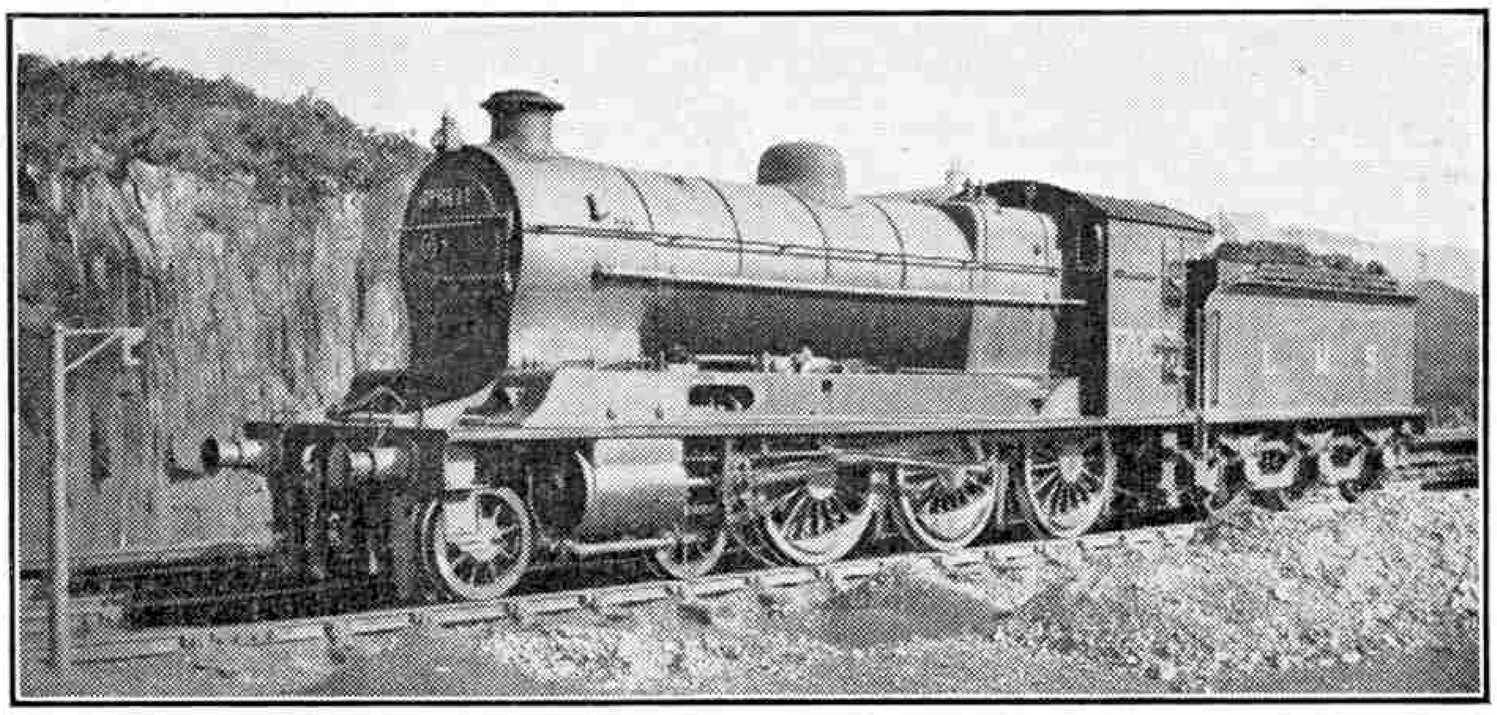
Driver Burfoot and his enormously powerful engine now set about time recovery in earnest. Indeed, load and circumstances considered, there ensued one of the finest climbs of Stoke bank ever recorded in ordinary service by a 4–6–2, for the weather was stormy with cross winds. *"Seagull"* worked up to a steady 70 m.p.h. on the slightly rising grades past Tallington and Greatford Box, and was travelling at no less than 63 m.p.h. at Little Bytham, well up the bank. The north-west wind was now blowing across the track with almost gale force, but speed at Corby was 52–53½, followed by a minimum of 46 at the top of the 1 in 178, the 15.3 miles between Tallington and Stoke summit being covered at all but a 60 m.p.h. average. After a maximum of 67 m.p.h. on the final descent Grantham was reached in 129¾ min., only 1¾ min. late notwithstanding delays of fully 16 min., so that the net time was equal to on to Waverley. The timings are more liberal in this section, but gradients are steeper and this was a very heavy train to work so successfully unaided.

The southbound *"Flying Scotsman"* often loads to 19 or 20 heavy vehicles, so do other expresses into King's Cross.

Welsh Line to be Dismantled

The Welsh Highland Railway has been purchased for dismantling by George Cohen, Sons and Co. Ltd., London W.12. In consequence, some 1,200 tons of relayable rails, several thousand sleepers and a considerable tonnage of scrap will become available for the national war effort.

The railway was of 1 ft. 11½ in. gauge. It was about 28 miles in length, connecting Portmadoc and Dinas Junction, in Caernarvonshire. There were two locomotives; a 2–6–2 tank built in 1906 at Hunslet Foundry, and a 4–6–0 tank built at Baldwin Locomotive Works, U.S.A., in 1917. The name and number plates of these locomotives are being handed over to the Railway Museum at York at the request of Mr. V. Boyd-Carpenter.



A special 4-6-0 for mixed traffic and heavy gradient duties on the Highland section of the L.M.S.

THE EGYPTIAN STATE RAILWAYS

Egypt has been considerably in the public eye recently, for its strategic importance to British Overseas communications cannot be over emphasised. Its trunk railways are operated by a State Transport Committee with British and Egyptian officers. They extend from Cairo to Shallal and Upper Egypt, Alexandria and Port Said, comprising, with a network of branch and connecting lines in the Nile valley, the equivalent of some 2,815 miles of standard gauge single track. Other standard and 2 ft. 6 in. gauge routes are also worked in Delta and desert areas, as well as in Upper Egypt.

The westward branch from Alexandria to Mersa Matrouh is of great importance. It is 183 miles long and as so far existing had been under Government control since 1914, though it is only lately that the whole length has been completed as a standard gauge route. Early in 1936, at the time of Anglo-Italian tension regarding Abyssinia, over 60 miles of track between Fuka and Mersa Matrouh were relaid in 97 days. This work included a formidable cutting, six bridges and culverts, four stations with buildings and signals and other subsidiary new equipment, and was carried out during a succession of sand storms in an almost waterless area. A water tank wagon was regularly run behind the engines bringing up supply trains. Successive temporary railheads en route were equipped with sidings and loops or triangles for turning locomotives, as was finally done at Mersa Matrouh.

A number of new 2–6–0 mixed traffic engines have been supplied to Egypt by the North British Locomotive Co. Ltd., some of which have Caprotti valve gear. Modern 2–6–2 tanks work many of the local services, while the long familiar Belgian-built series of 4–4–2 express engines are still in evidence on the Pullman and Restaurant-car expresses.

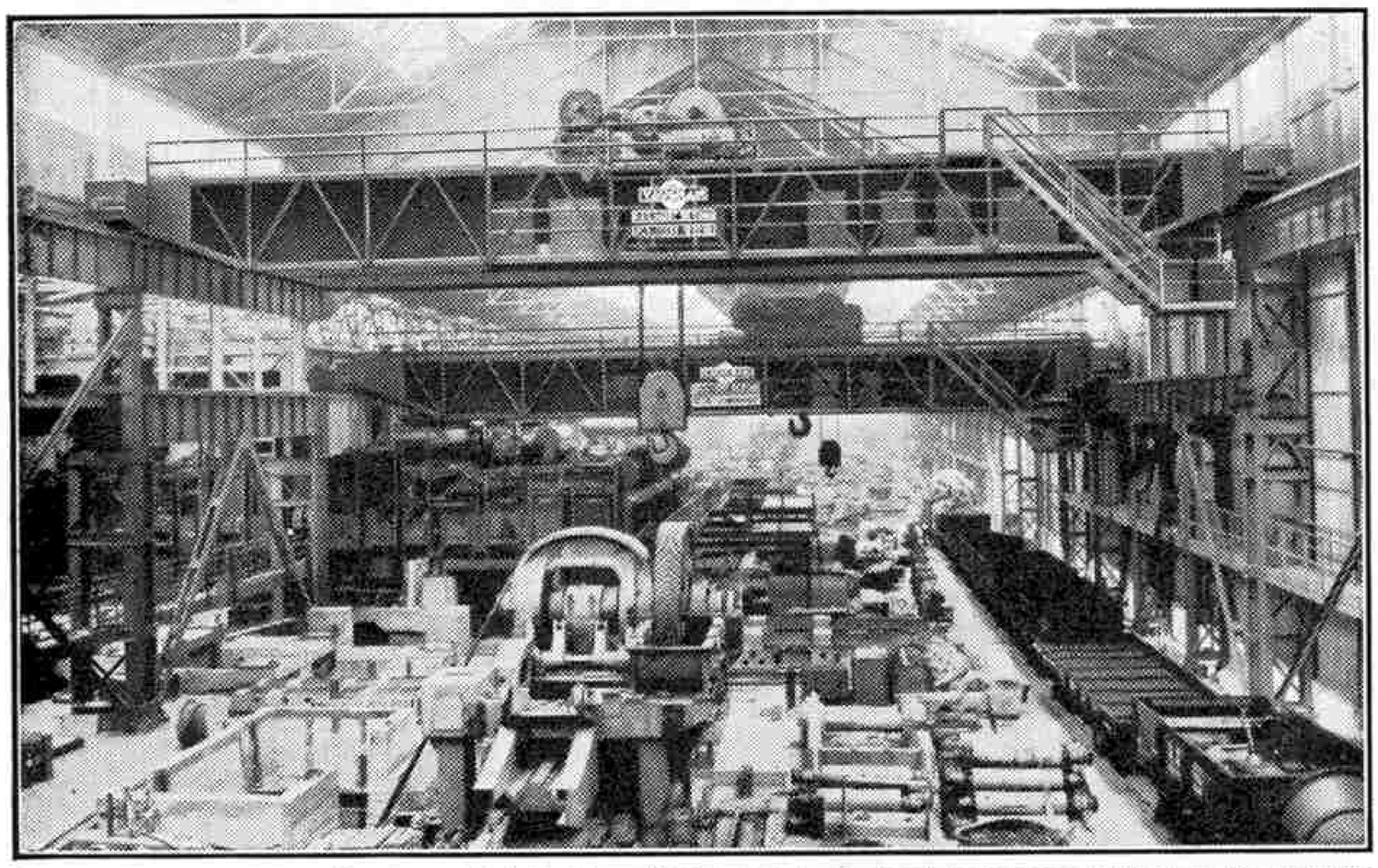
SURVIVING BRITISH 0-8-2 TANK ENGINES

The 0–8–2 wheel arrangement has never been seen on a large scale in this country, and at the present time it is believed that there are only 17 engines of this type in Great Britain. Of these survivors 16 belong to the inside-cylindered class of 30 built at Crewe between 1911 and 1917 to the designs of Mr. Bowen Cooke, and numbered 7870-99 in the L.M.S. lists. They have long been familiar on hilly, provincial routes of the former L.N.W.R., on which they are used as mixed traffic engines.

The remaining survivor, G.W.R. No. 1358, dates back to 1901, when it was built for the Port Talbot Railway in South Wales by Sharp, Stewart and Co. Ltd. as one of three for that small busy industrial line. These were numbered 17-19. They were outside cylinder locomotives similar to those built earlier for the neighbouring Barry Railway, and which were withdrawn after acquisition by the G.W.R. They also had coupled wheels of 4 ft. 3 in. diam., the radial wheels were 3 ft. 6 in. in diameter, and the cylinders 20 in. diameter with a stroke of 26 in.

The most numerous 0–8–2 class was found on the former Great Northern system, as there were 41 of the "116" series of this wheel arrangement built originally for London suburban passenger traffic. They were found to be too heavy for the Metropolitan lines and so were removed, chiefly to the West Riding colliery districts in Yorkshire. Some were later superheated and one or two temporarily fitted to burn oil fuel. A few returned to King's Cross after 1920 for empty passenger stock working, but the entire class has now been extinct for some years.

A short-lived class of 0–8–2 tanks was introduced in 1908 by the former Lancashire and Yorkshire Railway. Four in number these were heavy and powerful locomotives with cylinders 21½ in. diam. and 26 in. stroke. They had 4 ft. 6 in. coupled wheels and weighed 84 tons. In spite of their ponderous nature they were, like most modern Horwich designs, handsome engines, and they spent most of their time in heavy shunting and banking duties. As a small class they were doomed to a short life under the L.M.S. standardisation programme and have all been withdrawn.



Two large overhead travelling cranes installed in a British steelworks. Each has a span of 90 ft. and is operated by five separate motors. Photograph by courtesy of The Vaughan Crane Co. Ltd.

ENGINEERING NEWS

Mine Drainage Tunnel Eight Miles Long

A novel scheme for deepening a mine shaft by digging up to it from below is now under consideration by the engineers of a gold mining area in the United States. For some time the Ajax mine at Cripple Creek, Colorado, was idle owing to flooding, over 500 ft. of water standing in its workings. This is one of several mines in the area and its 2,608 ft. shaft is the second deepest in the district, being exceeded only by the Portland No. 2 shaft, which reaches a depth of 3,027 ft.

In order to drain these mines, and to allow them to be carried down to ore now inaccessible, a tunnel is being driven through the hills at a lower level than their shafts. Work on this bore, known as the Carlton Tunnel, has been in progress since 1939, and at a point nearly 29,000 ft. from its portal a fault was penetrated and water gushed out in torrents. All the water in the Ajax mine was drained away in the following two weeks, and the engineers of the companies concerned are now planning to drive a shaft upward from the tunnel to the Ajax mine. This novel method of deepening the mine would be economical, as it would not interrupt operations and all the excavated material could be removed through the tunnel, leaving the existing shaft for the handling of ore.

The Carlton Tunnel is the third drainage tunnel that has been driven through this mining area. The previous bore, known as the Roosevelt Tunnel, was 1,130 ft. higher than the new one. It was begun in 1907 and its use prolonged the life of the mines of the Cripple Creek area by 20 years. Equal success is looked for from the new tunnel, which will have a total length of more than 8 miles and will terminate 200 ft. below Portland No. 2 shaft.

* * * *

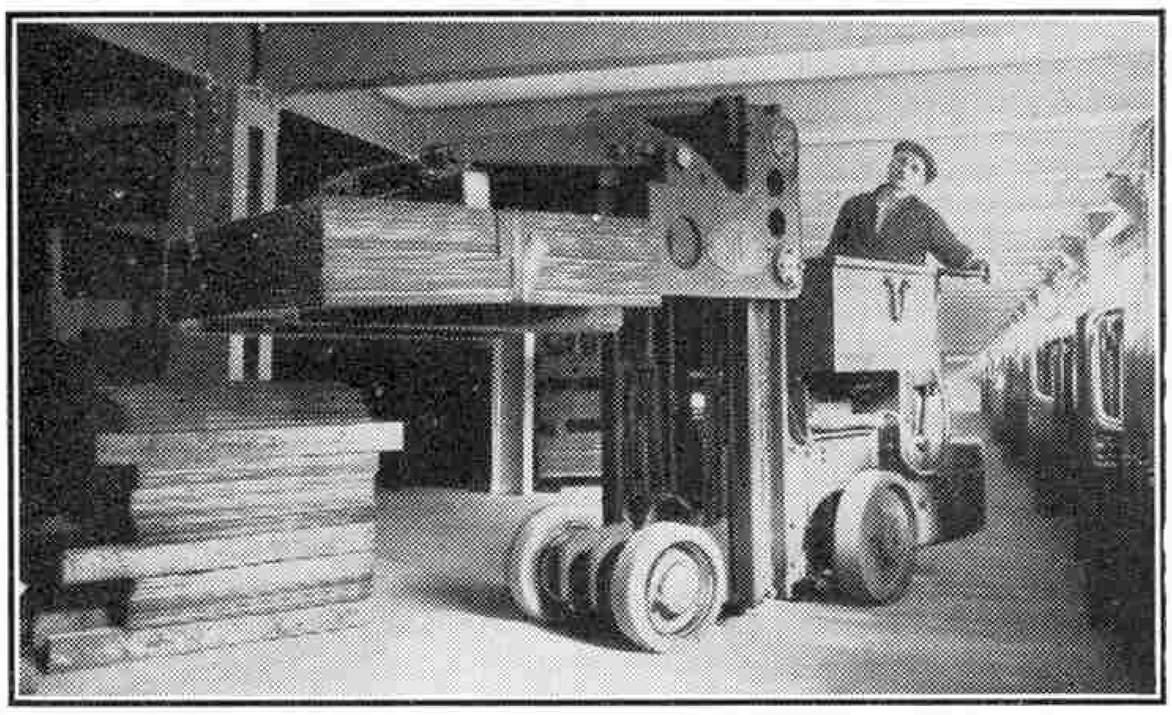
A wharf built at Stoney Point, Ontario, on the south shore of Lake St. Clair, has been completed in only 12 working days. The wharf is 120 ft. long and has an average width of 35 ft. It is built on piles driven to a depth of 12 ft.

A Novel Electric Truck

The lower illustration on this page shows an electric battery-driven truck specially designed for making the maximum use of a basement in the works of a large firm of motor manufacturers, where there is very little headroom and no possibility of using cranes.

The truck, which was manufactured by Greenwood and Batley Ltd., Leeds, is shown carrying sheet steel plates used in the manufacture of car bodies. It picks up 2-ton loads at a time from the railway siding where they are unloaded, then carries them into the basement and stacks them up to 5 ft. high. Later, when they are required in the press shop, the truck picks them up again, carries them up a ramp to ground level, and deposits them alongside the presses on which the bodies are formed. The truck will travel with a full load at a speed of 5 m.p.h. It lifts 2 tons at a rate of 8 to 10 ft. per min., and is fitted with an automatic stopping device that prevents the lifting carriage travelling too far. The plates are automatically clamped in place as they are picked up.

In order to allow the truck to work in very restricted space all four wheels are steerable and are fitted with solid rubber tyres. The truck is steered from a tiller conveniently situated at the left of the driver's platform, and the provision of interchangeable batteries allows its use night and day continuously.



An electrically-driven truck for carrying and stacking steel plates. It was manufactured by Greenwood and Batley Ltd., Leeds.

New Life-Saving Devices

A wireless transmitter small enough to be built into a suitcase and sufficiently powerful to be heard 200 miles away is now carried in most ships in case the crew have to take to the life-boats. With this set an unskilled person can send the S.O.S. signal by simply pressing a switch. The set has already proved its worth. On one occasion 17 men in a life-boat sent out an S.O.S. that was picked up 90 miles away, and they were rescued within seven hours.

Wireless receivers, electric light-buoys attached to ships' life-rafts for use at night, and a device that flashes the S.O.S. signal in Morse continuously for 48 hours are other new devices introduced for saving life at sea.

Mining Limestone from Great Depths

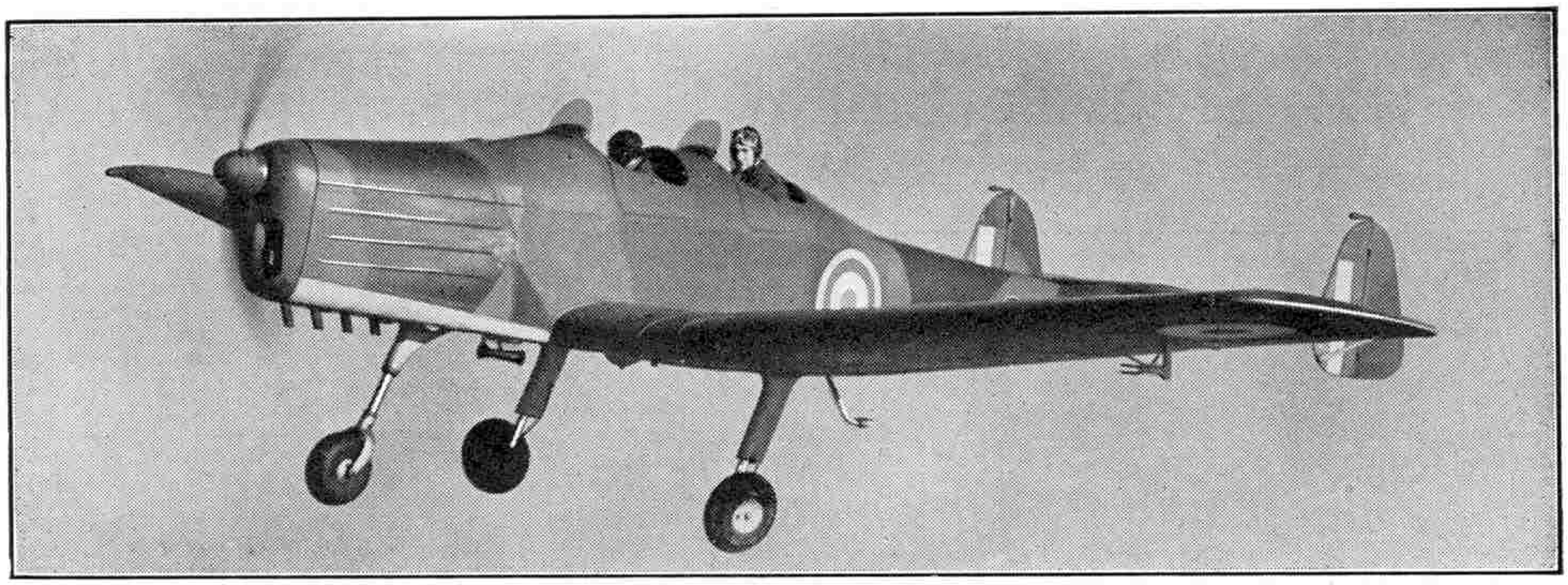
Two deep shafts are being sunk at the limestone mines of the Pittsburgh Plate Glass Company in the United States, which are now being developed for a production of 300 tons of limestone per hour. Each shaft will be sunk to a depth of 2,200 ft., and the limestone will be mined on what is known as the room and pillar system. The area covered by the mine is about 600 acres, and it is estimated that it will have a productive life of about 70 years.

An All-Welded Hangar

A new hangar built recently at the municipal airport at Baltimore, U.S.A., was erected entirely by arc welding and is said to be the first of its kind constructed by this method. The structure is 240 ft. long and 130 ft. wide, and contains 221 tons of steel. The use of welding resulted in a saving of 60 tons as compared with a riveted structure of the same size. About 5,300 lineal feet of welding were carried out in the constructional workshops prior to erection on the site.

Sweden Turns to Producer Gas

Nearly all motor traffic in Sweden is now operated on producer gas. Early this year there were 45,000 vehicles running on this fuel, of which about 60 per cent. used gas produced from charcoal, while 40 per cent. were fitted with wood burners. The Swedish State Railways have in service more than 100 rail buses driven by producer gas, and many new vehicles of a similar type have been ordered. Some of the private railways also are operating their rail buses on producer gas.



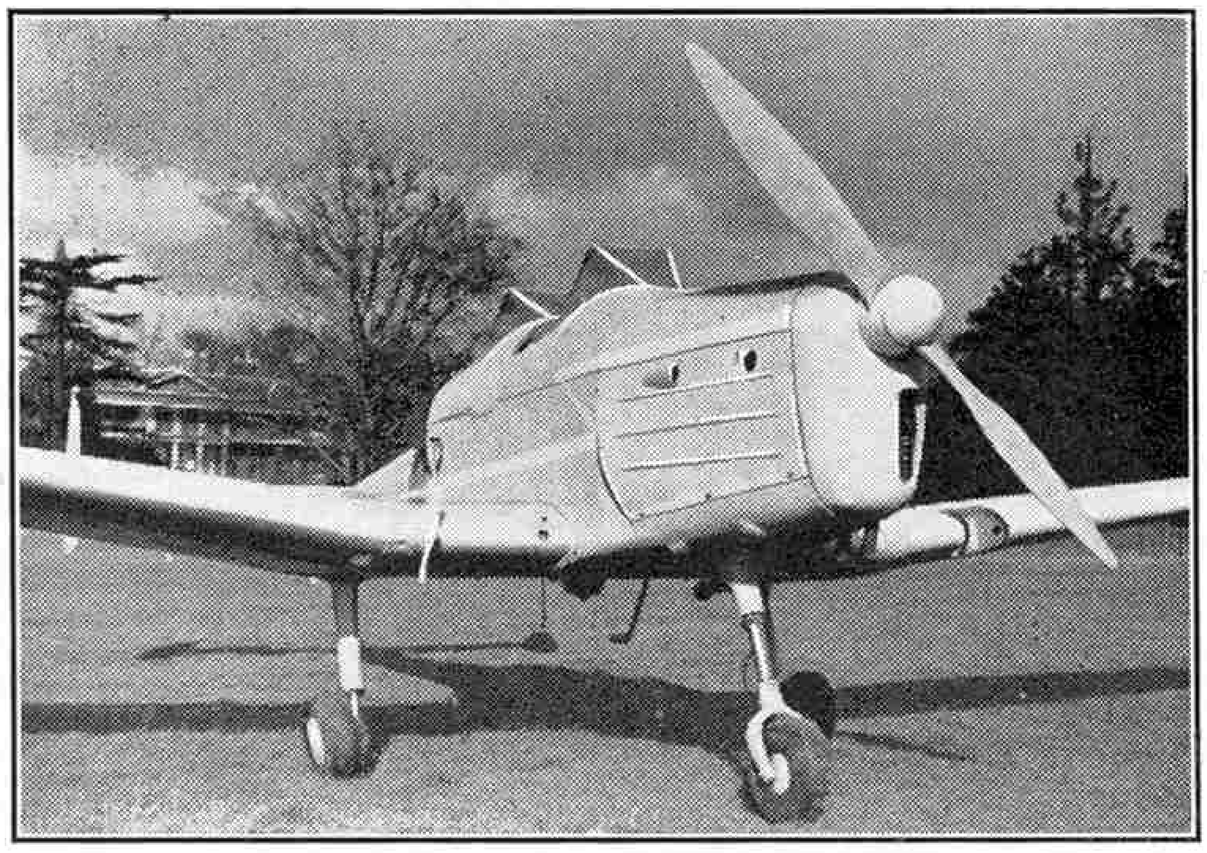
General Aircraft "Owlet" Trainer.

General Aircraft "Owlet"

A Trainer with Three-Wheel Undercarriage

BIG American aircraft with three-wheel undercarriages, such as the Consolidated "Liberator" and the Douglas "Boston," are coming into service in the Royal Air Force. Landing a machine thus equipped requires a different technique from that employed in landing a "two-wheeler," and although this type of aircraft is easier and safer to land it has been found that pilots who have not before flown a tricycle aircraft, rarely know how to make use of its great advantages. It has therefore been found necessary to put them through a conversion course, to enable them to explore the merits of the new technique of tricycle landing.

The General Aircraft "Owlet," illustrated on this page, provides for teaching pilots this new technique, and one of these machines has been acquired by the Royal Air Force and sent to a Squadron equipped with American tricycle type aircraft. The "Owlet" can be landed safely at any speed between 60 and 100 m.p.h. As the machine approaches the aerodrome, the pilot puts the nose down and leaves it there. When any one of the wheels of the undercarriage meets the ground, the machine settles down on to a level keel without any severe bump or tendency to bounce, even though the resulting run across the ground is made at flying speed.



A near view showing the disposition of the undercarriage legs. Photographs by courtesy of General Aircraft Ltd.

It is the first British light aeroplane to be introduced during the war, and the original "Owlet" made its first flight on 5th September last year. In addition to being ideal for preparing pilots in the handling of large three-wheel aircraft it is intended as an initial trainer for flying school work, for special training in night flying and for blind approach instruction.

The "Owlet" has been developed from the company's well-known three-wheel "Cygnet" two-seater cabin monoplane, which was illustrated on page 183 of the April 1940 "*M.M.*," and many of the structural parts designed for that machine are utilised in the new one. This has effected a big saving in the cost of tools for building the "Owlet," and also will enable quantity production to be put in hand with the minimum of delay when this step becomes practicable.

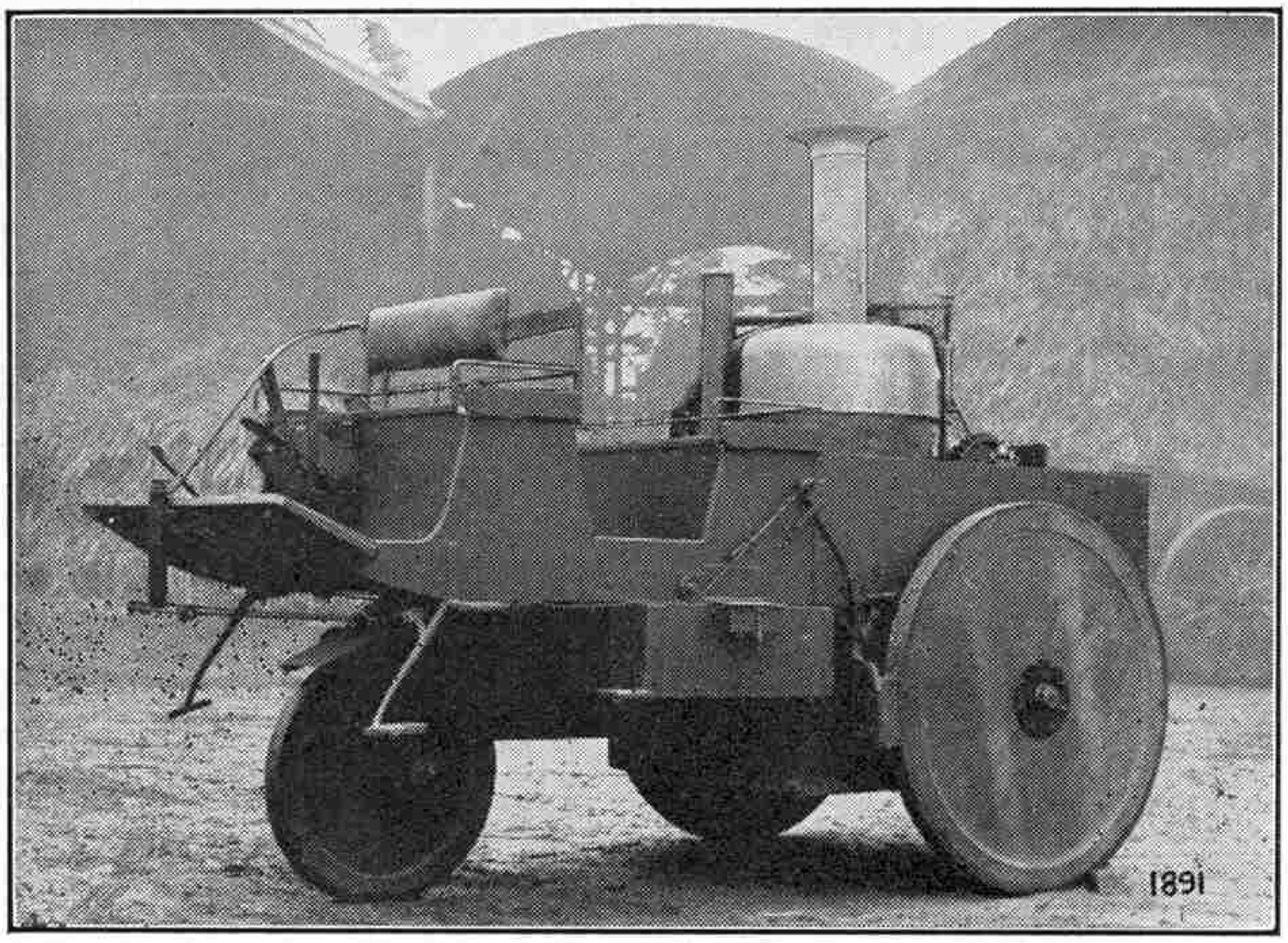
The new trainer is an all-metal low wing monoplane, with two open cockpits, one behind the other. Each cockpit has a windscreen for protection, and a seat of the type normally fitted for use with parachutes. There is a small luggage locker behind the rear seat.

The two main legs of the undercarriage are attached to the ends of the rear centre-section wing spar. The front leg rotates in bearings attached to the fireproof bulkhead just behind the engine, and can be steered through links to the rudder bar or disconnected and locked in a "straight ahead" position. The wheel brakes are operated by a handle in the floor of each cockpit and to the left of the seats, and an over-riding control is provided for the instructor so that he can correct excessive braking by the pupil.

The "Owlet" has a 150 h.p. "Cirrus Major" engine, and can attain a top speed of 127 m.p.h.

The Grenville Steam Carriage of 1875

By the late Major G. W. G. Allen



The Grenville Steam Carriage of 1875. Photographs by courtesy of "The Edgar Allen News."

THIS old vehicle, which belongs to an era before the invention of the petrol engine and the production of the lighter forms of steam motor cars, is believed to be the sole survivor in this country of a type of carriage of which several were built in the 1860's and 70's. It is probably the oldest self-propelled passenger carrying vehicle on the road in the world. It was in use until about 1897.

It was designed by and built for R. Neville Grenville, Esq., of Butleigh Court, near Glastonbury, and was used by him as a private carriage.

In many respects its design embodies the railway practice of that time, and it is probable that much of it was constructed in the Newton Abbot shops of the South Devon Railway. Mr. Grenville had been apprenticed there with his close friend, Mr. Churchward. In later years he used to fire G.W.R. engines as a pastime.

The carriage was discovered about two years ago at Butleigh Court, and was found to be in a remarkably good state of preservation as the photographs, which show it there as it was found, will prove.

After it was no longer in use on the road, it was used to drive a cider press, a pulley being bolted to the left rear wheel. This accounts for the streaks across the face of the wheel. It continued to be used thus until a few years ago, and was then laid aside. The writer, who makes a hobby of finding and running veteran vehicles, heard of its existence, and obtained it with a view to putting it in order, so that it might be shown to the public on the Brighton and the other Veteran Car Club runs. It is hoped that ultimately it will find a resting place in the South Kensington Museum.

Its design and the excellent workmanship throughout are of the greatest interest. In many ways the design was ahead of its time. The frame, inside the lower part of the body, is made of light 4 in. by 2 in. "I" beams. These carry the boiler, the engine, which is also supported on the boiler, the shaft bearings, spring brackets and front suspension.

The original boiler was found to have rusted out. It had a huge blister on the fire-box, and was quite beyond repair. It has been replaced by an exact replica. Of the vertical fire engine type, it was made by Shand Mason, and contained 50 one inch cross water tubes placed in 10 oblique rows. It was not an easy matter, even with modern boiler-making facilities, to work the tubes into the round taper fire-box, as the original designer had left no margin for error. The working pressure was 120 lb. per sq. in. and the heating surface 29 sq. ft. The grate area was $2\frac{1}{2}$ sq. ft. The fire space is shallow, so that it is difficult to maintain a fire free from holes.

Originally a single cylinder engine was fitted; the mount was still on the boiler, but this was found to be unsatisfactory, and was replaced by a two-cylinder engine placed horizontally on the right, alongside the boiler. The cylinders are of gunmetal, and are not steam jacketed. Bore 5 in. by 6 in. stroke. Slide valves and normal link motion are employed. The working parts of the engine are of robust design, and valve rods are of the same size as the piston rods and have extensions supported by guides. The crankshaft extends across the vehicle and carries on the left side a gear wheel which engages an equal wheel on the second-motion shaft. Combined with this first wheel there is an epicyclic gear with a dog clutch, by which a 2–1 reduction can be obtained. The second-motion shaft extends back across the vehicle, and carries on its other end a pinion which gears with a differential wheel, ratio 1–4, on the back axle.

The back axle extends through both road wheels and is keyed to the left one, the right being driven by a sleeve from the differential plate wheel. These gears are all of cast steel, and resemble those employed on the older types of steam roller.

Plain bronze bearings are used throughout with wick-feed oil cups.

The rear axle is sprung from the frame with semi-elliptical springs, 4 ft. long by 3 in. wide, shackled at both ends. Short torque rods are fitted, but their anchorage is not in correct relation to the normal movement of the springs. The rear axle and second-motion shaft are coupled, and move up and down together on the right side, but the second motion shaft-bearing on the left is fixed, the resulting angular motion being accommodated by trunnions on the bearing. This causes the first pair of gear teeth to slide across one another and has no harmful effect. This system of springing is a very close anticipation of Burrell's patent for springing Traction Engines of 1887.

I thought it prudent to renew the rear axle, for it would have been a sad disaster if it had broken on a run. It and the original boiler have been stored so that they can be replaced when the carriage comes to rest in a museum.

The rear wheels are discs of teak, 4 ft. in diameter, constructed of 16 sectors beautifully fitted together, and were as sound as on the day they were made. They had been turned all over after assembly. The tyres are of iron secured to the discs by eight fastenings, which are half in the discs and half in the tyre. They are headed on both sides, and the writer is at a loss to know how they were inserted. It is doubtful if they could have been headed cold, and certainly they were not put in hot. They may be screwed together internally, or possibly they were put in place with the sectors splayed out sideways, the latter then being forced into the tyres by pressure on the flat of the wheel, the hubs, of the artillery type, keeping the sectors flat afterwards. Of course there is the possibility that the tyre was squeezed in radially on to the sectors and fastenings, but this would seem to require too much contraction of the tyre to be likely.

The front wheel is of similar construction, 2 ft. 6 in. in diameter, on an axle, which runs in bronze bearings at both ends, in a fork which is built up ingeniously from a distorted girder section. The vertical spindle is held upright by parallel links, at the top of which there is a semi-elliptical spring extending across under the front seat. The frame is suspended from this by two links. The tiller is coupled to this spindle by parallel links. The steering is quite good though somewhat heavy, and fortunately the machine prefers to go straight ahead, but care must be taken on corners as the front wheel then tends to take charge and turn square across the track.

When the carriage was built, the law required three persons to be in charge of a mechanically-propelled vehicle, so the driver, who only steers and controls the regulator and the reverse, has on his right

The Carriage seen from the rear.

a brakesman.

The fireman behind has a rather unenviable job, despite which I have had many applications for the position on the Brighton run. His accommodation can hardly be said to be comfortable, though apart from exposure to the elements the six persons in the front seats have little to complain of, and he is kept fully occupied when on the road and indeed before, as it takes half an hour, if all goes well, to get up steam. The fire needs very frequent attention, and if the driver happens to throttle down when the fire door is open, a gush of flame comes out. The boiler is fed by a large pump driven from the second-motion shaft, hence it only works when the carriage is running. There is also an ancient and very erratic injector for use at other times. It is fatal to use it much on the road, as it eats steam. The stoker needs to keep his eye continually on the water gauge, as the level is liable to change surprisingly suddenly with a change in the gradient of the road. Going up hill it is not easy to keep the glass full, and when going down hill and using no steam the boiler may be overfilled quite quickly.

A copper lined wooden tank holding about 50 gallons of water is slung under the body with filling pockets on both sides. There is no waterlift. The feedwater heater is on the pump delivery, and consists of a vertical tube in which the exhaust steam jackets the feed pipe. Evidently an attempt was made to collect the condensed water from this and return it to the tank by means of a long coil of brass pipe of small bore. This, however, has been disconnected and is blocked solid, probably by lubricant.

The boiler has a single water gauge, testcocks, two steam gauges, one for the driver, a spring loaded lever safety valve and a blower. The cylinder lubricator is designed to use suet.

Gear changing is the duty of the fireman, and fortunately is rarely necessary, since collaboration between him and the driver is not easy. The regulator, which the driver operates, is rather quick-acting, and there is no neutral position on the gears, a wise precaution which prevents the machine from running out of control on a hill, so that it is necessary to get the elliptic assembly in a precise position before the dog clutch can be shifted. The driver has to feel for this position with no knowledge as to how much movement is required to reach it. The procedure has not yet been sufficiently mastered to enable gear changes to be made without delay.

The body is of mahogany and seats six. It is uncertain whether cushions were used; undoubtedly they are very desirable on long journeys, though on good roads the springing is surprisingly good. The stoker's compartment has a little seat for him on one side, and is of sheet metal, as is the floor under the rear part. The ash pan has dampers fore and aft.

The machine has been completely dismantled, and every part examined but, with the exception of the boiler and rear axle, it was not found necessary to renew a single part. Indeed, the bearings did not really need refitting. This work was completed just before the outbreak of war, and several trial runs, totalling some 20 miles, were made.

As was to be expected, some minor troubles were met with, mainly due to the lack of experience of the crew. It was found that the carriage, properly stoked, had ample power, and could face hills of 1 in 10 or steeper in fast gear. A maximum speed of about 18 m.p.h. can be reached, and the average over 5 miles of a give and take road was just 10 m.p.h. It will not be possible, however, to maintain that average on, say, the Brighton Run, as the water consumption is about 4 gallons to the mile, so that the maximum non-stop run on a fill cannot exceed 10–12 miles. The engine will pull well at very low speeds on hills.

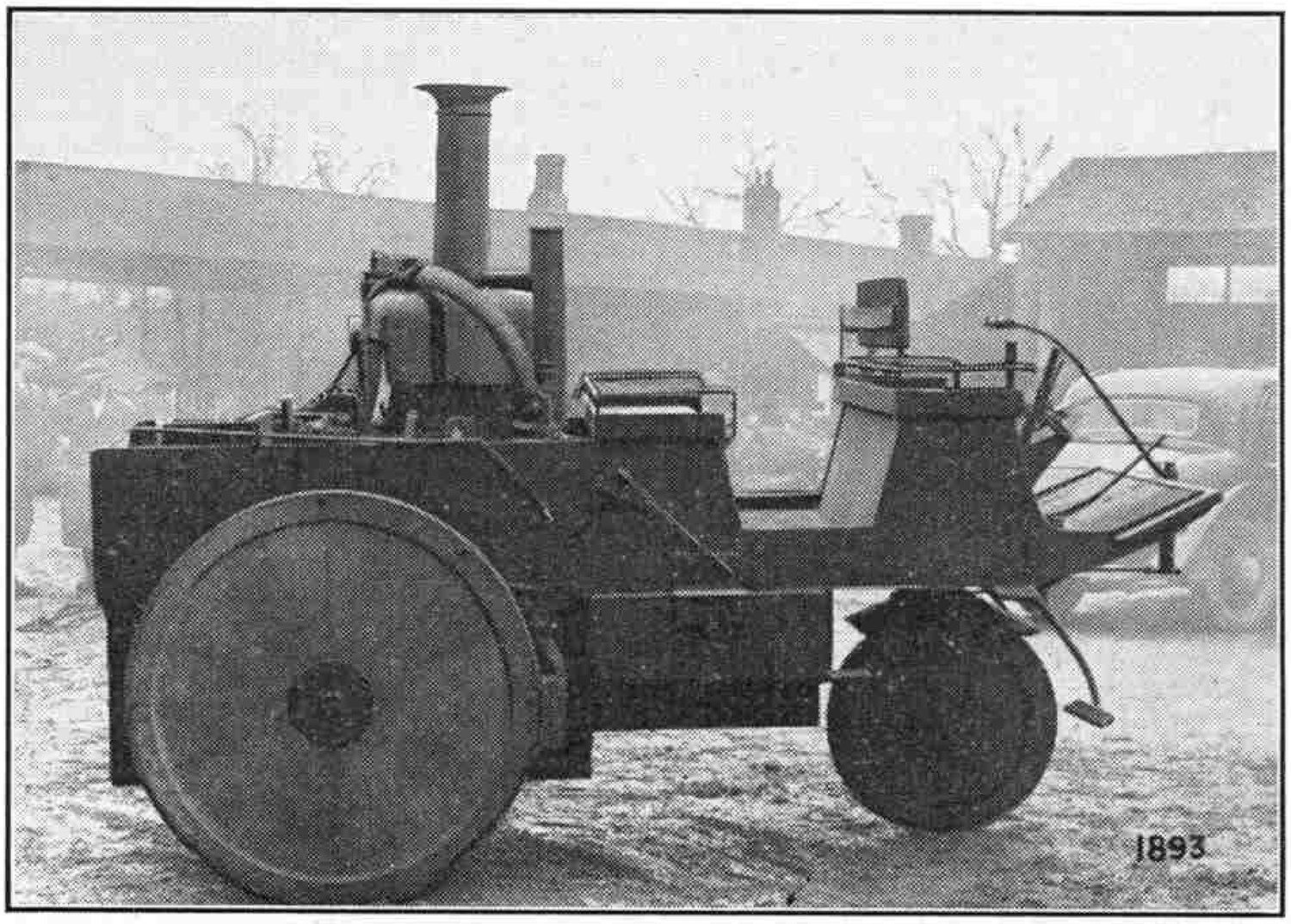
At the time the carriage was built, the law only allowed a speed of 2 m.p.h. in towns and 4 m.p.h. in the country, and a man had to precede the vehicle on foot by not less than sixty yards. He did not have to carry a red flag, as, contrary to general belief, that provision was done away with by the Act of 1865.

The carriage is easy to drive, and handles well. The gears rattle somewhat, but there is much less noise than one would expect The writer is fairly accustomed to driving veteran vehicles, but passengers find the high unprotected front seats quite alarming at speed.

The boiler is inclined to prime, which makes the exhaust very wet; this and the oil thrown off by the engine renders the wearing of old clothes desirable. Probably experience will enable these minor inconveniences to be minimised.

The overall length is 11 ft. 6 in., width 5 ft. 7 in., height to top of chimney 8 ft. 3 in. The weight, including coal and water, is 46½ cwt., so that it will be judged how well the weight of so large a machine has been kept down by good design. No part, except one end of the rear axle, looks too light for its job, neither can one find any parts which are obviously too heavy, and the way in which the whole has stood up to many years' work proves the amount of thought and skill which went into the building of each part.

This article is reproduced from "The Edgar Allen News" by courtesy of the Editor. It is fortunate that this fine old carriage came to survive in such a remarkably good state of preservation and that it fell into the hands of one who so fully appreciated these relics of the forefathers of the motor car, and was in a position to put them on the road again in the same condition as that in which they first ran.



Side view.

FIRESIDE FUN

LESS OF TWO EVILS

Smith: "Why on earth did you encourage your daughter to quit playing the piano and take up the clarinet?"

Jones: "Because when she's playing the clarinet she can't sing too."

* * * *

Pat fell from the top of a factory chimney that he and Mike were building. As white as a sheet, Mike rushed down the ladder to the ground. He found Pat sitting up and rubbing his head.

"Are you hurt, Pat?" he asked.

"Not much," replied Pat. "And I had to come down for some more bricks, anyway!"

* * * *

Sam: "What do you think of a man that throws a banana skin on the footpath?"

Tom: "I don't know. What do you think of a banana skin that throws a man on the footpath?"

* * * *

For years all events affecting the village were held "by kind permission of Mrs. Blank." A few weeks ago she died; and when air raids were discussed among the villagers one day Grandpa remembered Mrs. Blank . . . . and shook his head emphatically.

"They won't come over thus 'ere village," he said.

"Why not?" asked a friend.

Grandpa shook his head again.

"Because they can't get Mrs. Blank's kind permission," he explained.

* * * *

A minister was loud in his praise of the fat and juicy bird his coloured host served for dinner, and finally asked: "Where did you get such a fine goose as that?"

"Pahson," replied his host, "when you preaches a good sermon Ah doan ax you whar you got it. Ah hopes you'll hab de same consideration for me."

* * * *

Teacher: "Spell 'dog'?"

Small Boy: "D – u – "

Teacher: "There's no 'u' in 'dog'."

Small Boy: "Well, there was when he was a pup."

* * * *

Early in the morning the jerry-builder was awakened by an excited night-watchman.

"Please, sir," he gasped, "one of the new houses has fallen."

"What!" roared the builder. "You mean to say that one of my new, well-built, desirable villa residences has come to grief? How did it happen?"

"Well, sir," explained the watchman, "as far as I can make out, there was a little mistake. The men took the scaffolding down before they put the wall-paper on."

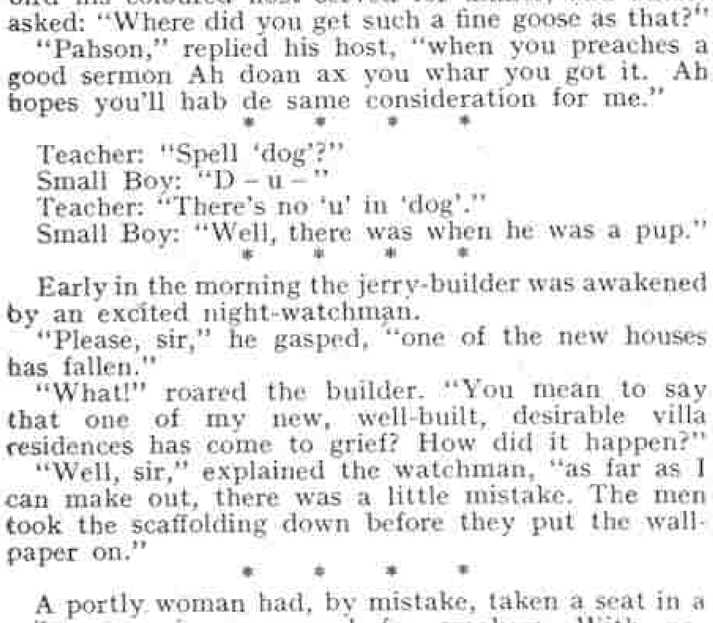
* * * *

A portly woman had, by mistake, taken a seat in a railway carriage reserved for smokers. With unconcealed indignation she saw the man next to her fill his pipe.

"Sir," she said in frigid tones, "smoking always makes me ill."

The man calmly lit his pipe and puffed contentedly before replying, "Does it, ma'am? Well, take my advice and give it up."

* * * *



Professor: "Here you see the skull of a chimpanzee, a very rare specimen. There are only two in the country—one is in the National Museum and I have the other."

SIMPLE

"The enemy are as thick as peas."

"Then shell them!"

* * * *

"I was rather disappointed in that gentleman you introduced to me last night."

"Indeed! How so?"

"Why, you spoke of him as a bridge expert, and he turned out to be nothing but a famous engineer."

* * * *

Country youth visiting the British Museum: "What do you make of the number on that mummy, Sam?"

"Well, I should say it was the number of the motor car that killed him."

* * * *

The profiteer's wife was having her new home decorated. The place was literally overrun with painters and paperers. The foreman approached the lady and reported. "We have completed the morning room, ma'am; what next?"

"You can do the study on Friday," he was told.

"What shall I do in the interim, madam?"

"Oh, paper that too," the lady replied.

* * * *

"You said this was a good watch-dog you sold me."

"Well, what's wrong with it?"

"Last night we had burglars, and the blinkin' dog snored so loudly that we didn't hear them!"

* * * *

Stout Lady: "I would like to see an evening dress that would fit me."

Assistant: "So would I, madam."

* * * *

Hotel garage mechanic (to owner of small baby car, who has been giving him very minute instructions): "Alright, alright—I'll see it's refilled, and washed, and polished, and if yer like I'll 'ave it left outside yer bedroom door, with yer boots, in the morning!"

* * * *

THE WHOLE CRUET

Teacher: "Can anyone tell me what happened after Caesar mustered his army?"

Brown: "Yes, he peppered the enemy, and took the citadel by assault."

Teacher: "Sit down, I'll take no sauce from you."

* * * *

According to an historian, pancakes were first made in the old English monasteries. Out of the frying pan into the friar!

* * * *

"I tell you I won't have this room!" protested the old lady to the bell-boy who was conducting her. "I'm not going to pay my good money for a poky little hole with a measly little folding bed in it. If you think that just because I'm from the country—"

"Get in, lady, get in," the boy cut in, "this isn't your room, this is the elevator."

* * * *

Rastus was in trouble again, and the Judge asked him if he were guilty or not guilty. "Guilty, suh, ah thinks, but ah'd rather be tried'n make sure of it."

* * * *

Boaster: "I'll try anything once."

Bored Listener: "Try poison!"

* * * *

THIS MONTH'S HOWLER

"A metaphor is a thing you shout through."

A MATTER OF TASTE

Mother: "Your birthday is to-morrow, Jimmy. How would you like a cake with 13 candles—one for every year of your life?"

Jimmy: "Don't you think it would be better with one candle and 13 cakes?"

* * * *

Jim: "Have you ever noticed that most successful men are bald?"

Bob: "Naturally; they come out on top."

* * * *

When a certain enterprising chap was considered for a consular post in China he was asked:

"Are you aware that appointment of a consul is hardly ever recommended unless he speaks the language of the country to which he desires to go? Now I suppose you do not speak Chinese?"

The candidate grinned broadly. "If," he said, "you will ask me a question in Chinese, I shall be happy to answer it."

He got the appointment.

* * * *

VICE VERSA

A dashing young fellow named Tim
Drove his car with a great deal of vim.
Said he: "I'm renowned
For covering ground."
But, alas, now the ground covers him.

* * * *

1st Fireman: "Where's the fire?"

2nd Fireman: "There isn't one!"

1st Fireman: "But you said the fire bell had gone."

2nd Fireman: "So it has . . . Someone's pinched it!"

* * * *

Teacher: "The drawing of the horse is good, but where is the wagon?"

Pupil: "Oh, the horse will draw that!"

* * * *

There used to appear in the catalogue of an American mail order firm a picture of a pair of corduroy trousers, which were offered for sale at three dollars. Year after year the advertisement appeared.

In the tenth year the company received this letter:

Dear Sirs: "The more I see of them corduroy breeches the more I get wanting them. If you ain't sold them yet, let me know, and I will buy them. Yours truly, Rastus Brown."

* * * *

"Your family history goes back a long way?" asked a casual acquaintance of a noble lord.

"Yes," replied his lordship, swelling with pride. "We came over with the Conqueror."

"Ah" said the questioner, "My family greeted him when he landed."

* * * *

Passenger: "Is this plane safe?"

Pilot: "Yes, safest on earth!"

* * * *

An Irishman and an Englishman had a quarrel in a field, and eventually they decided to fight it out with their bare fists.

The Englishman, seeing that they had no referee, told the Irishman that when one wished to give in he would say "Sufficient."

For an hour they went at each other hammer-and-tongs till neither could hardly stand.

Eventually the Englishman gasped out "Sufficient."

"Begorra," said the Irishman, "that's the word I've bin trying to think of for the last half-hour."

* * * *

Father: "What are your prospects of promotion, young son?"

Son: "Splendid, father. There's nobody in the firm below me."

* * * *

The reporter opened his notebook and waved his pencil. He approached the man who had just left the lion's cage.

Reporter: "You are the famous lion-tamer that the whole town is talking about?"

Man: "Me? Not likely! I'm only the cove wot combs their manes and cleans their teeth."

* * * *

Hawker: "Any pop bottles, lady?"
Housewife: "Do I look as if I drink pop?"
Hawker: "Any vinegar bottles, lady?"

From Our Readers

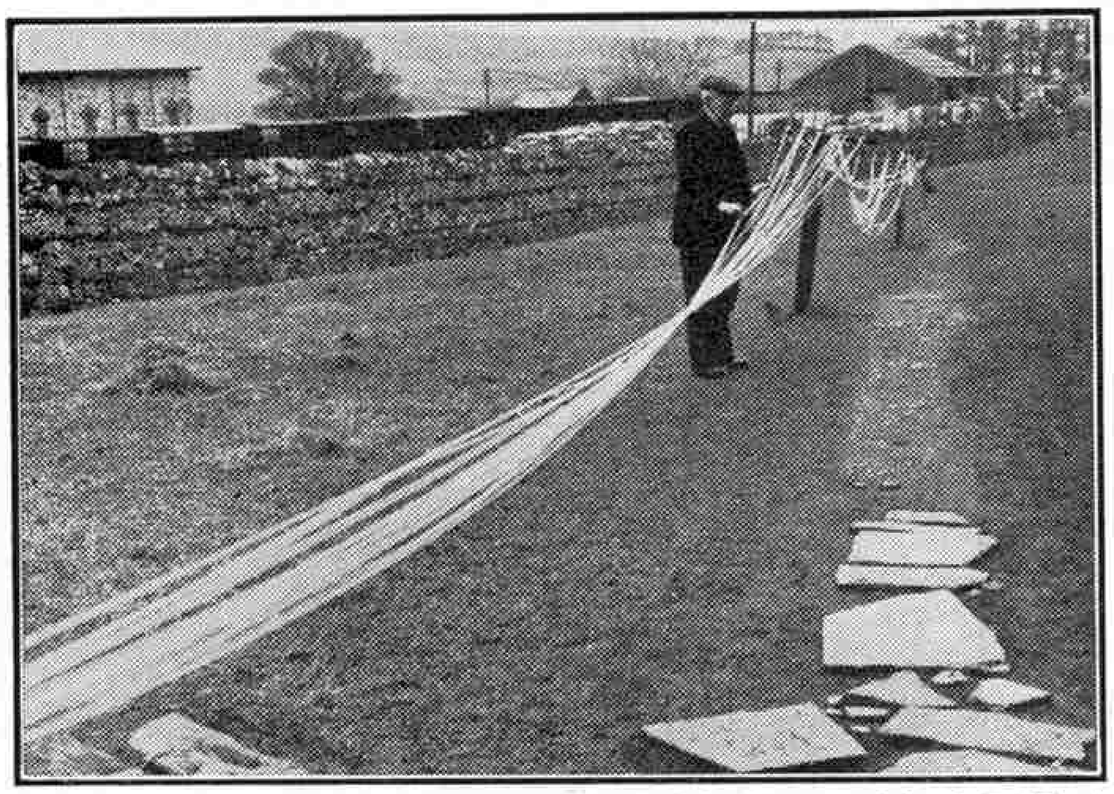
This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

Curious Rope-Making Devices

While at Hawes in Upper Wensleydale recently I met Mr. William Outhwaite, one of the few surviving craftsmen who make ropes by hand, and I was able to see and photograph him at work. The process of making a rope begins on the twisting frame, or spinning wheel, the belt or cord of which rotates four small pulleys known as "twirls," to each of which are attached the various fibres that have to be spun or twisted into yarn. Naturally, these fibres are very long—much longer than Mr. Outhwaite's shed. Accordingly, after attaching one end to the "twirls," the craftsman passes the fibres through the open door-way and arranges them on a series of vertical T-shaped posts in the field beyond. This "rope-walk" is shown in the accompanying illustration.

The third process is to "lay" the strands so spun into ropes. For this, a curious, primitive-looking apparatus is called into play. It comprises two vertical wooden frames, and after sliding one of them backward or forward according to the length of rope required, Mr. Outhwaite arranges the strands between them. Each strand is attached at one end to a set of rotating hooks, operated by a hand crank, which impart a "back twist," thus producing a firm rope. Firmness is secured also by the use of a conical wooden "top" fitted with deep grooves, in which the different strands are placed before rotation begins. Later, while the crank is being turned by his assistant, Mr. Outhwaite controls the forward slide of this "top" by means of its wooden handle—holding the "top" back, as it were—thereby preventing "slackness" in the rope.

G. B. Wood (Leeds).



An old-time rope walk at Hawes, in Upper Wensleydale. Photograph by G. B. Wood, Leeds.

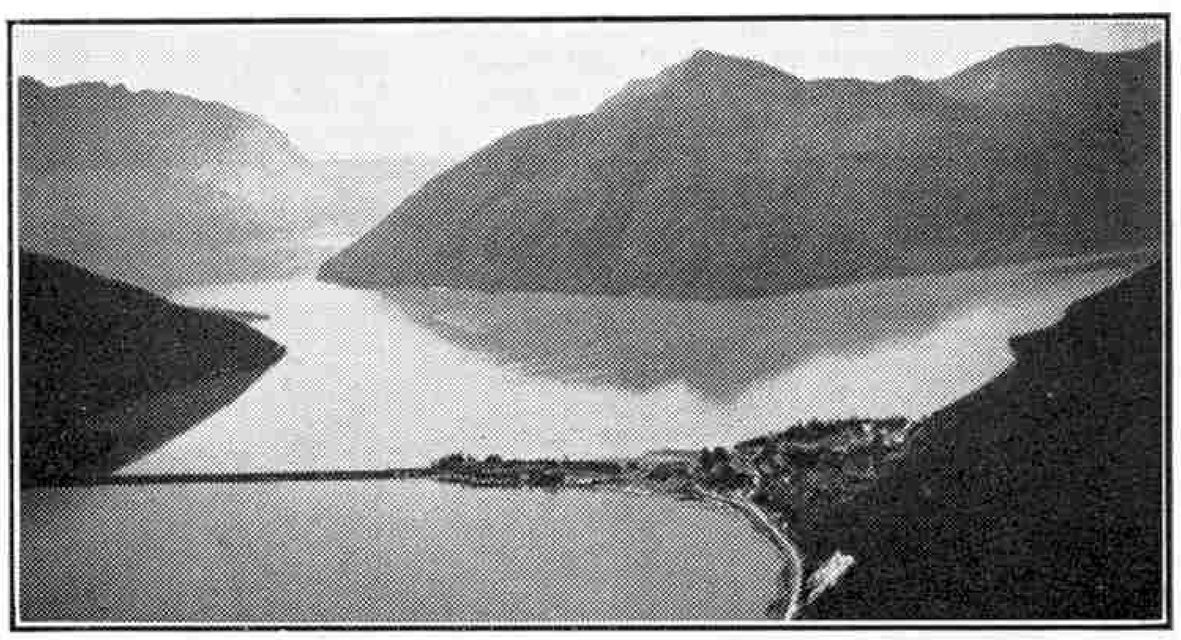
A Remarkable Swiss Bridge

While on a visit to Switzerland just before the outbreak of war I had an opportunity of seeing the Melide Bridge across Lake Lugano on more than one occasion. This bridge is remarkable chiefly on account of its site. Many thousand years ago a glacier from Monte Generoso near by brought down hundreds of tons of rock and earth and piled them at the base of the mountain. It then commenced to push a narrow arm of land across the lake. This arm never quite reached all the way across, but it was a fairly easy task to bridge the gap, and so to-day we have the Melide Bridge, which is crossed by the St. Gotthard Railway and the main road from Lucerne to Milan, both of which can be seen closely hugging the mountain side quite close to the lake, which here is just over half a mile wide.

The first time I saw the bridge was during a motor-boat trip on the lake, when we passed through one of the three small arches at one end of the bridge, and which are the only means of communication by water with the two arms of the lake that in the accompanying illustration can be seen disappearing in the distance. The next time I saw the bridge I had the view given in the photograph, which was taken from the top of a mountain about 2,000 ft. in height. There was a wonderful view from the summit in spite of the haze, and electric trains that from above looked like toys crawled along the track, vanished into tunnels, and reappeared. The effect was similar to a bird's-eye view of a model railway.

Later I crossed the bridge on my way to Milan, the industrial metropolis of Italy and a very beautiful city. There I saw the magnificent cathedral and an altar of solid gold and silver that is studded with precious stones and is said to be worth £3,000,000. The huge railway station of Milan looks like a palace.

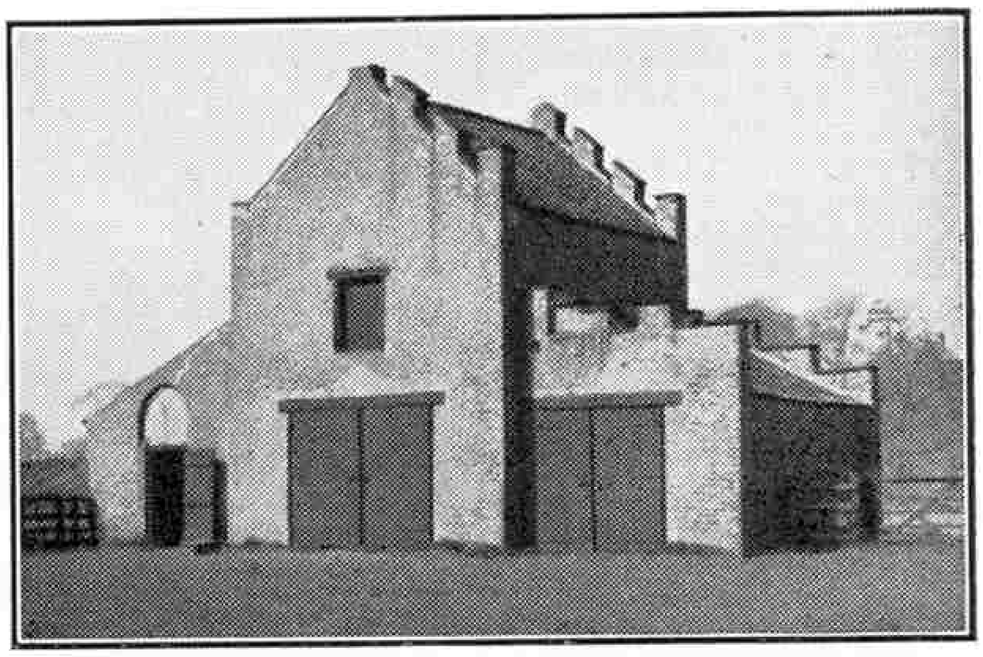
H. A. Coleman (Leicester).



The Melide Bridge, across Lake Lugano, in Switzerland. It is crossed by the St. Gottnard Railway and the road from Lucerne to Milan. Photograph by H. A. Coleman, Leicester.

Leper Hospital Now a Farm Building

Leper hospitals, which were sometimes called lazar houses, or lazarettos, were once quite numerous throughout the land, but with few exceptions they have disappeared. Not the least interesting of the few that remain is the 12th century one on Baydale Farm, a mile and a half west of the centre of Darlington, which is shown in one of the illustrations on this page.



A farm building at Baydale, near Darlington, that was once a leper house. Photograph by J. Durey, Newcastle-on-Tyne.

This quaint old building, with its castellated roof, even now enjoys the splendid isolation once necessary, in the centre of an extensive piece of meadowland that separates the Barnard Castle road from the river Tees. It is not known exactly when it was erected there, but it was certainly in use in the 12th century because it is mentioned in the Boldon Buke, that great survey made in 1183 by Hugh Pudsey, then Prince Bishop of Durham. The name is first given as Bathela, and then as Badela. Later it became Bathly, and later still Badelfielde, before eventually becoming Baydale Hospital. William the Conqueror's Domesday Book survey did not include the county of Durham.

When it was no longer needed for the care of the unfortunate lepers, in the 14th century, the hospital became a free chapel or chantry in the patronage of the Bishop of Durham, who paid an annual salary to the chaplain out of his exchequer. The last chaplain was one Robert Bushel, who in 1553 received an annual pension of £2 6s. 8d. Since then the ancient hospital building has been in constant use as a spare outhouse and barn for Baydale Farm, which is a quarter of a mile away and is the nearest building of any sort to it.

J. Durey (Newcastle-on-Tyne).

New Meccano Models

Spring Balance and Streamlined Locomotive

THE two models we describe and illustrate this month are unusually attractive, and at the same time provide an interesting contrast with each other. One is a spring balance that can actually be used for articles that weigh up to about 8 oz. The other is a handsome miniature of the streamlined L.N.E.R. locomotive "*Sir Nigel Gresley*," the 100th "Pacific" built by the famous locomotive designer whose name it carries.

The balance is the simpler of the two models. It is shown in Figs. 1 and 3, and its construction is commenced with the base. A $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plate is bolted to two $2\frac{1}{2}''$ Angle Girders, and a similar Angle Girder is then secured to the base and has a Semi-Circular Plate attached to it. A 4" diam. Circular Plate and a $4\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 1 are fixed to the Semi-Circular Plate, the Double Angle Strip forming the bearings for a $6\frac{1}{2}''$ Rod 2, which carries at its upper end a Face Plate that serves as the scale pan. This Rod also carries three Collars, to the upper pair of which is bolted a $3\frac{1}{2}''$ Rack Strip 3. The Rack Strip engages a $\frac{1}{2}''$ Pinion 4, fixed on the end of a $1\frac{1}{2}''$ Rod journalled in the Circular Plate and a Double Arm Crank. The other end of this Rod carries a Pointer.

When a letter or other article is placed on the pan the $6\frac{1}{2}''$ Rod compresses two Compression Springs 5 on the Rod 2. The Rack Strip is maintained in engagement with the Pinion by a 2" Strip 6 bolted to a Double Bracket attached to the Circular Plate.

Parts required to build model letter balance: 1 of No. 6; 3 of No. 9d; 1 of No. 11; 1 of No. 14; 1 of No. 18a; 1 of No. 26; 14 of No. 37a; 16 of No. 37b; 11 of No. 38; 1 of No. 48c; 4 of No. 59; 1 of No. 62b; 1 of No. 72; 1 of No. 109; 1 of No. 110; 2 of No. 120b; 1 of No. 146a; 1 of No. 156; 1 of No. 214.

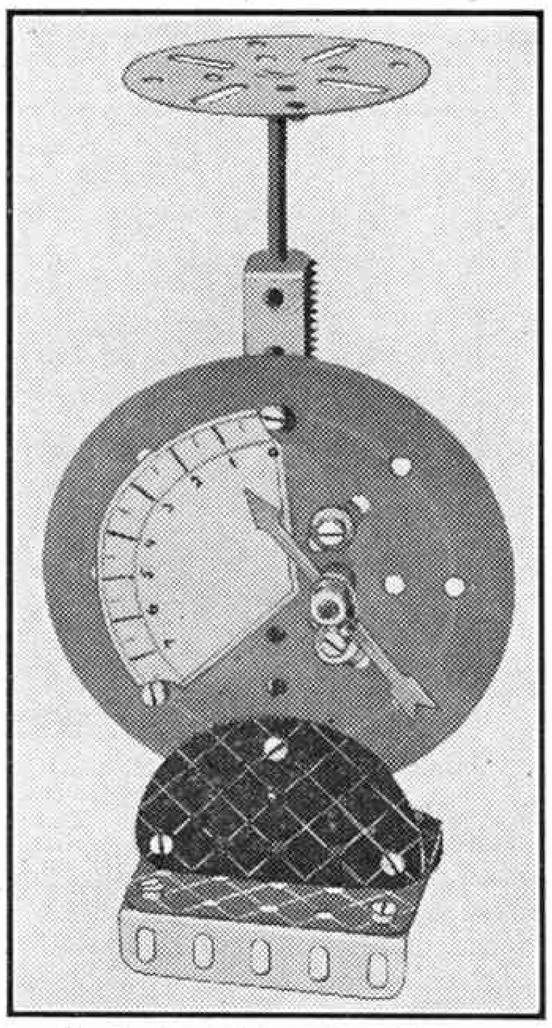


Fig. 1. A useful spring balance.

A general view of the model locomotive is shown in Fig. 4, and Fig. 2 shows what it looks like underneath. It is driven by either an E1 or an E120 Electric Motor. The chassis is the first part to build. Two $9\frac{1}{2}''$ Strips 1 are spaced apart by two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates 2, and are connected to $12\frac{1}{2}''$ Flat Girders 3 at each side by $\frac{1}{2}'' \times \frac{1}{2}''$ Angle Brackets. Two $5\frac{1}{2}''$ Angle Girders are attached to the Plates 2, and $5\frac{1}{2}''$ Flat Girders fixed to these by $1\frac{1}{2}''$ Strips form the bearings for the axles of the driving wheels, which are 2" Pulleys mounted on $1\frac{1}{2}''$ Rods. They are linked together by $5\frac{1}{2}''$ Strips lock-nutted to them, but are spaced from the Pulleys by three Washers.

The front of the engine is now built up and the valve gear connected to the centre pair of driving wheels, but the Plates covering the boiler are not bolted in position until the Electric Motor is fixed in the chassis.

The $12\frac{1}{2}''$ Flat Girders 3 are extended 1" to the rear by two 2" Flat Girders bolted to them. An E1 or E120 Electric Motor 4 is bolted by one of its flanges to one of these compound Flat Girders, and also is attached by a $\frac{1}{2}''$ Reversed Angle Bracket to the rear Flat Plate 2, and by a $1'' \times \frac{1}{2}''$ Angle Bracket to the Flat Girder 3. The drive from the Motor is taken from the Motor pinion to a 57-teeth Gear mounted on a 2" Rod journalled in the Motor sideplates. This Rod also carries a $\frac{1}{2}''$ fast Pulley that is connected by a 6" Driving Band to a 1" Pulley mounted on a 1" Rod journalled in Trunnions bolted to the Strips 1. A $2\frac{1}{2}''$ Driving Band links this Rod with a 1" Pulley 5 on the axle of the centre driving wheels.

The casing for the rear bogie consists of two $2\frac{1}{2}''$ Flat Girders spaced by two $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips. Two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates are bolted to the Double Angle Strips and bent round and secured to the ends of the Flat Girders by $\frac{1}{2}'' \times \frac{1}{2}''$ Angle Brackets. Two loose 1" Pulleys are lock-nutted to the sides of the casing, which is then pivoted to a $\frac{1}{2}''$ Reversed Angle Bracket bolted to the Motor sideplates.

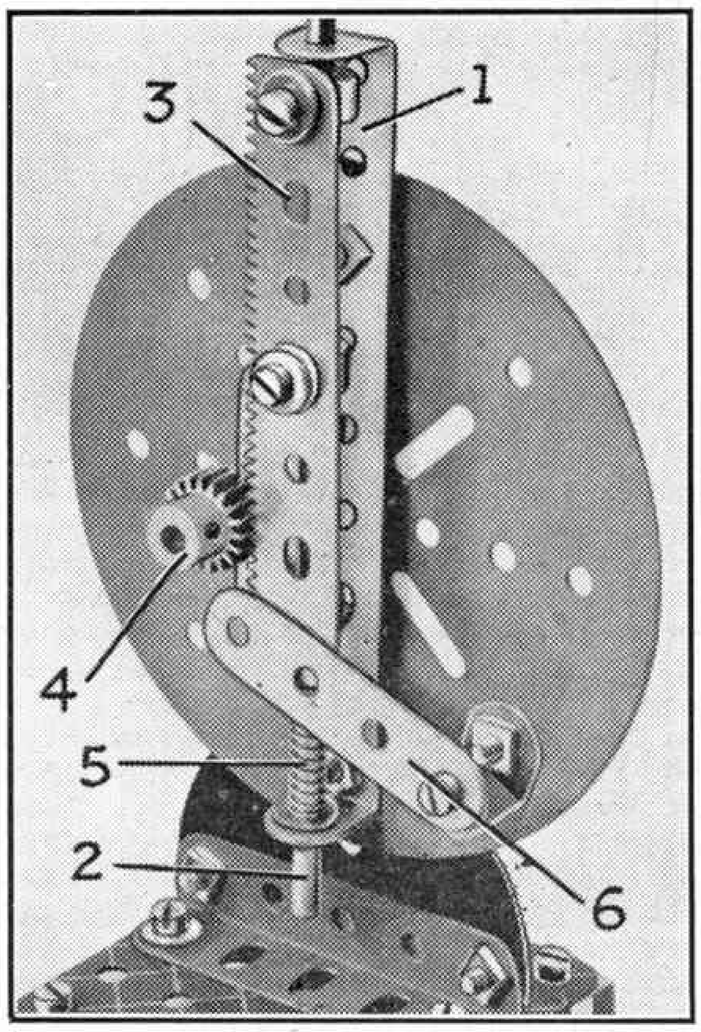


Fig. 3. Rear view of the spring balance.

The model is completed by bolting the boiler plates to a $12\frac{1}{2}''$ Strip, which is arranged down the centre top of the boiler and bent so that its forward end may be attached to the buffer beam. The cab is built from $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates bolted to the compound flat girders and attached at their upper ends to a large radius Curved Plate.

Suitable straight and large radius Curved Rails for the locomotive may be constructed from Angle Girders and Strips connected by Screwed Rods. A centre rail is then secured between these, but is insulated from them, and arranged to contact a current collector formed with a piece of springy brass and fixed to the locomotive chassis. The collector is insulated from the chassis and is connected by wire to the insulated terminal of the driving Motor.

It is important to make sure that all the wheels are in correct alignment and rotate freely in their bearings.

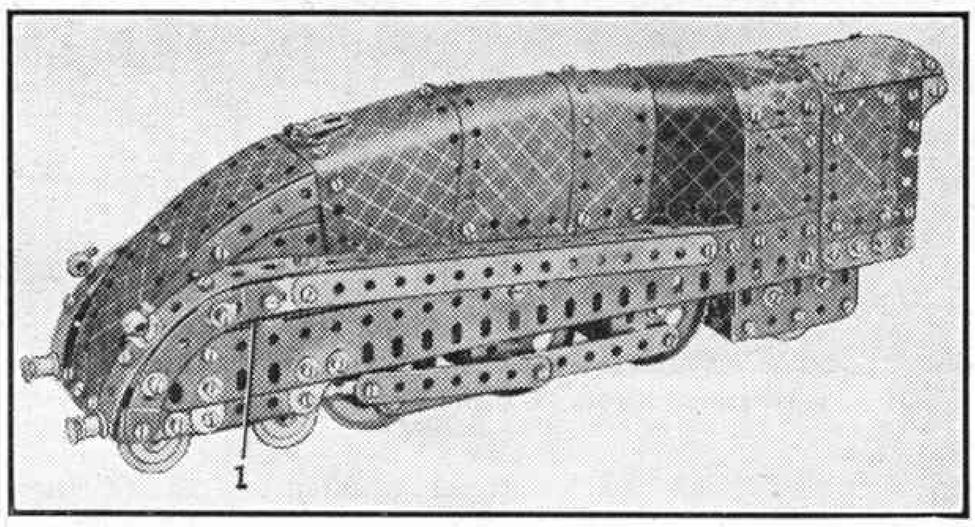


Fig. 4. An attractive streamlined locomotive driven by an Electric Motor.

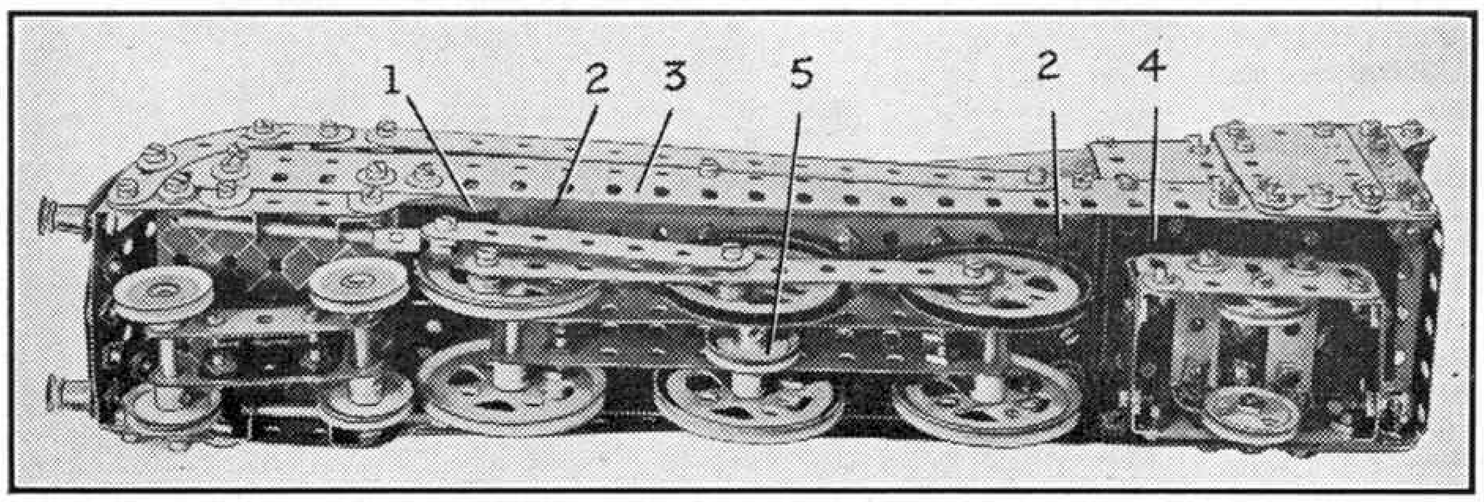


Fig. 2. An underneath view of the streamlined locomotive shown in Fig. 4.

Parts required to build streamlined locomotive: 1 of No. 1; 2 of No. 1a; 6 of No. 1b; 2 of No. 2; 2 of No. 2a; 2 of No. 3; 2 of No. 4; 7 of No. 5; 2 of No. 6; 4 of No. 6a; 2 of No. 9; 2 of No. 9d; 5 of No. 10; 27 of No. 12; 1 of No. 12b; 4 of No. 12c; 2 of No. 16a; 1 of No. 17; 3 of No. 18a; 3 of No. 18b; 6 of No. 20a; 6 of No. 22; 2 of No. 22a; 1 of No. 23a; 1 of No. 27a; 190 of No. 37a; 180 of No. 37b; 54 of No. 38; 1 of No. 47; 3 of No. 48; 1 of No. 48a; 1 of No. 59; 3 of No. 72; 1 of No. 77; 2 of No. 89a; 2 of No. 89b; 2 of No. 90; 2 of No. 103; 2 of No. 103b; 2 of No. 103f; 2 of No. 103g; 2 of No. 111a; 8 of No. 111c; 2 of No. 120a; 2 of No. 125; 2 of No. 126; 4 of No. 133a; 2 of No. 136; 1 of No. 160; 1 of No. 186; 1 of No. 186a; 6 of No. 188; 4 of No. 189; 2 of No. 190a; 2 of No. 192; 1 of No. 200; 2 of No. 212; 1 E1 or E120 Electric Motor.

Suggestions Section

By "Spanner"

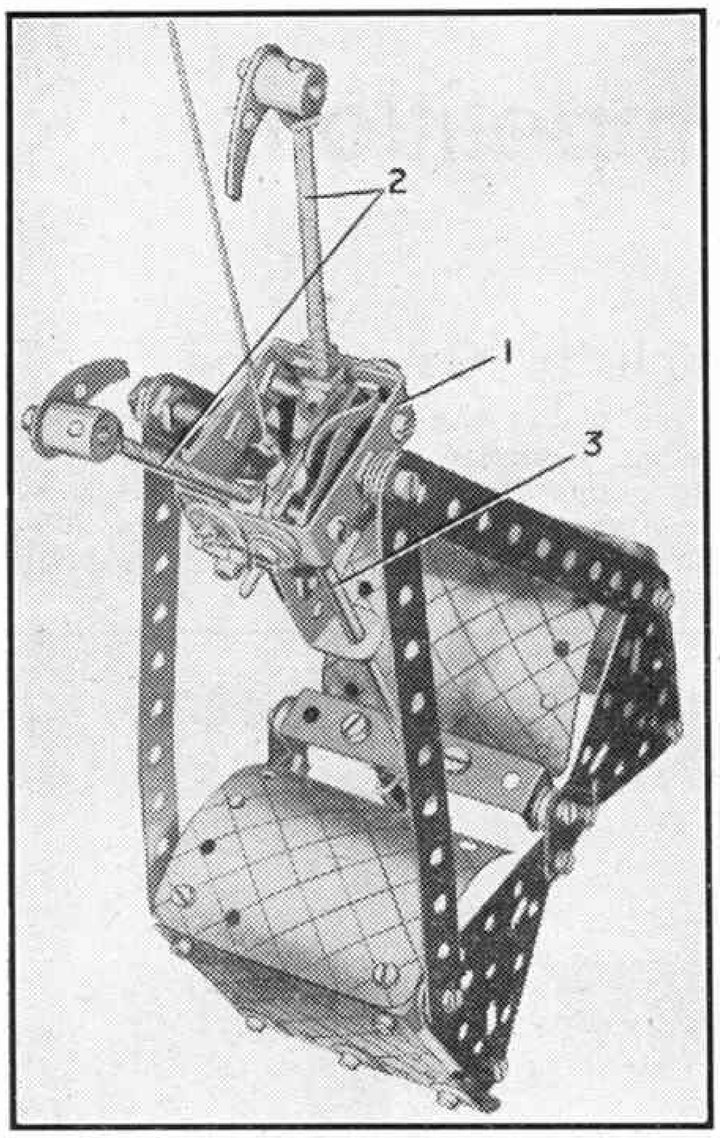


Fig. 523.

(523) Single Suspension Grab

(N. C. Ta'Bois, Woodford Green)

The framework of the useful grab shown in Figs. 523 and 523a consists of two $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 1 joined by Flat Brackets. Two Washers are put on the Bolts and one of them carries a Hinge against which bears a piece of Spring Cord. A Flat Trunnion is held by two $\frac{1}{2}''$ Bolts.

Each of the hooks 2 is a Screwed Rod to which a Pawl without boss is attached by means of a Threaded Boss. One of the Rods is 3″ long and the other $3\frac{1}{2}''$, and each carries a "spider" as shown. The "spiders" are screwed partly on to the $\frac{1}{2}''$ Bolts already mentioned, and further $\frac{1}{2}''$ Bolts fastened to them are free to turn in the holes of the Double Angle Strips. Flat Brackets, one of which is cranked, are fastened to the Bolts. A Bolt on the cranked Bracket protrudes into the elongated hole of the other Bracket. A piece of Spring Cord attached to the base of the hooks is just strong enough to pull them together.

A Washer is placed on a $\frac{3}{4}''$ Bolt, which is passed through the Hinge and carries four more Washers, a Collar and a Nut. A $\frac{1}{2}''$ Bolt is screwed into the Collar and bears against the $3\frac{1}{2}''$ Screwed Rod. A Collar on a 5″ Axle Rod 3 just touches the tip of the $\frac{3}{4}''$ Bolt when the hooks are on the suspender ring 4, and has a slightly bent Flat Bracket secured to it by a $\frac{7}{32}''$ Grub Screw. The 5″ Rod slides in a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip bolted to a 3″ Strip fixed to the Flat Trunnion. The lower end of the Rod passes through a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip and is free to slide up and down, but is prevented from turning by an Eye Piece and a $1'' \times \frac{1}{2}''$ Angle Bracket.

The suspender ring 4 is a 1″ fast Pulley to which a Socket Coupling and a Coupling are attached. A Sleeve Piece passes over the two Couplings, and a second Coupling is attached to the first by a Flat Bracket.

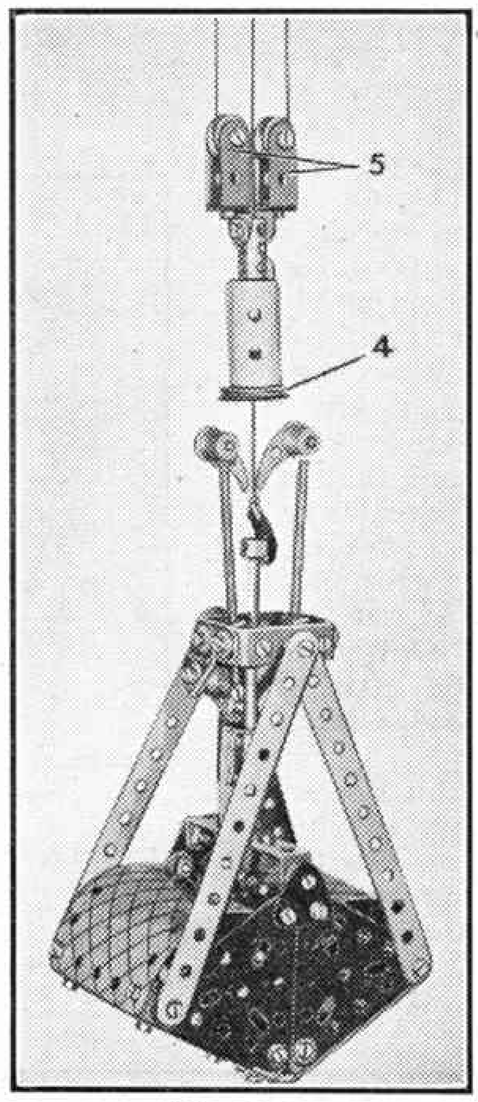


Fig. 523a.

(524) Automatic Wool Winder

(R. C. Smith, Hawera, New Zealand)

I received recently details of a useful wool winder designed by R. C. Smith, Hawera, N. Zealand. I had the model built up and it is reproduced in Fig. 524. It will wind a ball of wool direct from a skein, and if desired it may be used in conjunction with a model revolving skein holder.

The construction of the winder is commenced with the base. An E6 or E20B Electric Motor is bolted to two of three $5\frac{1}{2}''$ Angle Girders that are secured at their ends to $9\frac{1}{2}''$ Angle Girders 1. The bearings for the winding drum consist of Cranks bolted to the upper ends of a 3″ and a $7\frac{1}{2}''$ Angle Girder 2. The Girder 2 is attached to a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plate 3 fixed to one of the side-members of the base, and is braced by a $5\frac{1}{2}''$ Strip. This Strip is bolted to the Angle Girder and to a $4\frac{1}{2}''$ Angle Girder attached to an Architrave.

The gearing that drives the winding drum and the reciprocating guide arm through which the wool passes, is as follows. A Worm 4 on the armature shaft of the Motor meshes with a 57-teeth Gear 5 mounted on a 2″ Rod that also carries a $\frac{7}{8}''$ Bevel Gear. This Gear meshes with a similar gear on a $4\frac{1}{2}''$ Rod 6, which also carries a $\frac{1}{2}''$ Pinion, and a 1″ Sprocket that is connected by a length of Sprocket Chain to a similar Sprocket mounted on a $6\frac{1}{2}''$ Rod forming the winding drum. The wool is fastened to a Cord Anchoring Spring on this Rod.

The reciprocating motion for the guide arm is operated by a Triple-Throw Eccentric mounted on a 4″ Rod 7 journalled in a $2\frac{1}{2}'' \times 1''$ Double Angle Strip bolted to the Plate 3. This Rod is driven from the Motor through a $1\frac{1}{2}''$ Contrate Wheel meshing with the $\frac{1}{2}''$ Pinion on the Rod 6. The Eccentric is pivotally connected to a large Fork Piece that carries an 8″ Rod, the lower end of which is pivoted on a 1″ Rod passed through the centre hole of a $4\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip bolted between the Girders 1. At its upper end the 8″ Rod carries a Rod and Strip Connector through the eye of which the wool is passed.

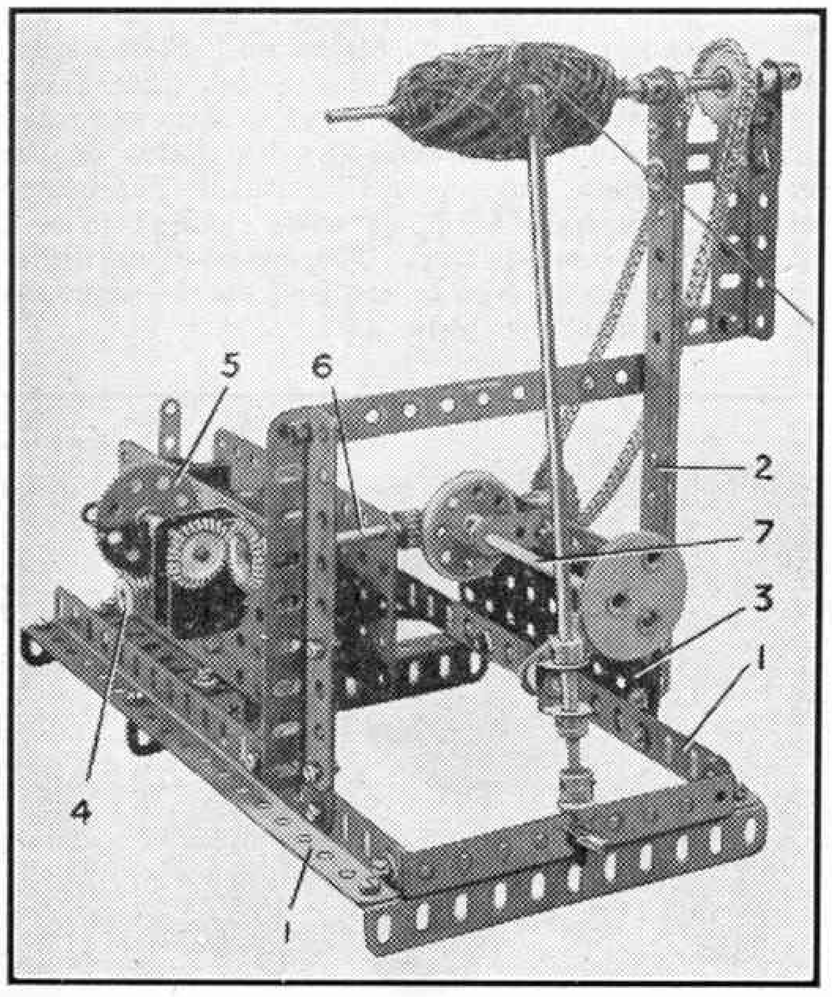


Fig. 524.

(525) An Aircraft Locator Apparatus (D. Perkins, Hull)

Fig. 525 shows an instrument designed to trace the course of an aeroplane on a map attached to a Ring Frame that forms the base of the model. Construction of the device is quite simple. A Coupling is free to slide along the Rods 3 and is connected by means of four 1″ Screwed Rods to two

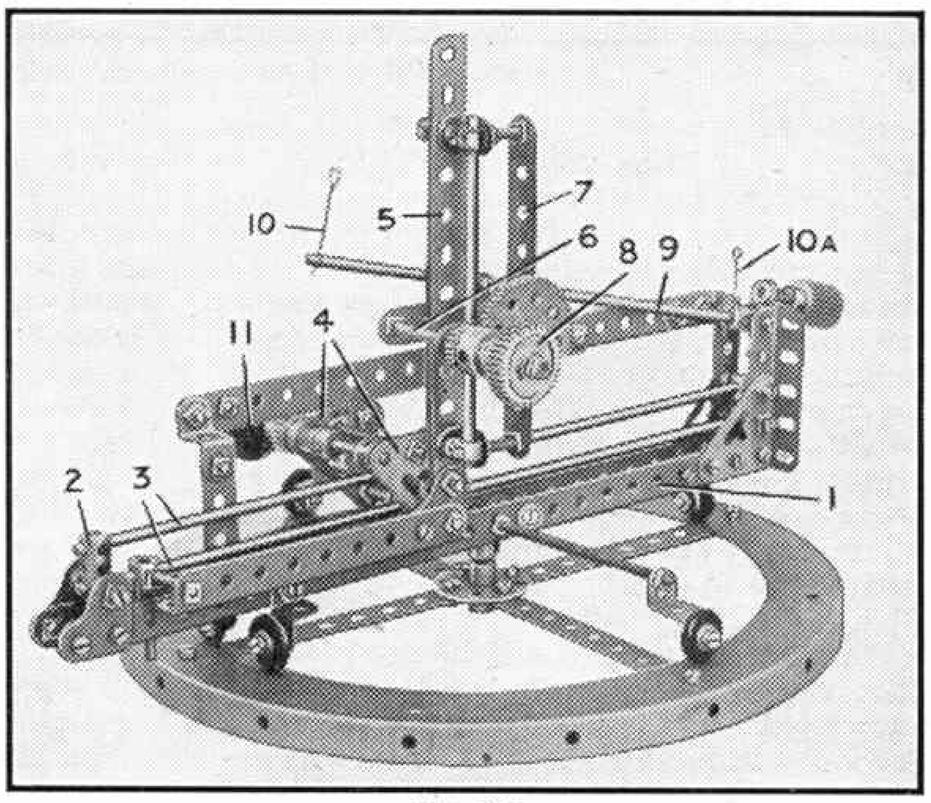


Fig. 525.

$1\frac{1}{2}''$ Corner Brackets 4, the left-hand one of these being bolted to a $6\frac{1}{2}''$ Rack Strip 5. A movable unit is built up from a $1\frac{1}{2}''$ and a 2″ Strip joined by a 3″ Screwed Rod 6, and is attached to Collars that slide up and down $4\frac{1}{2}''$ Rods fixed (Continued on page 332)

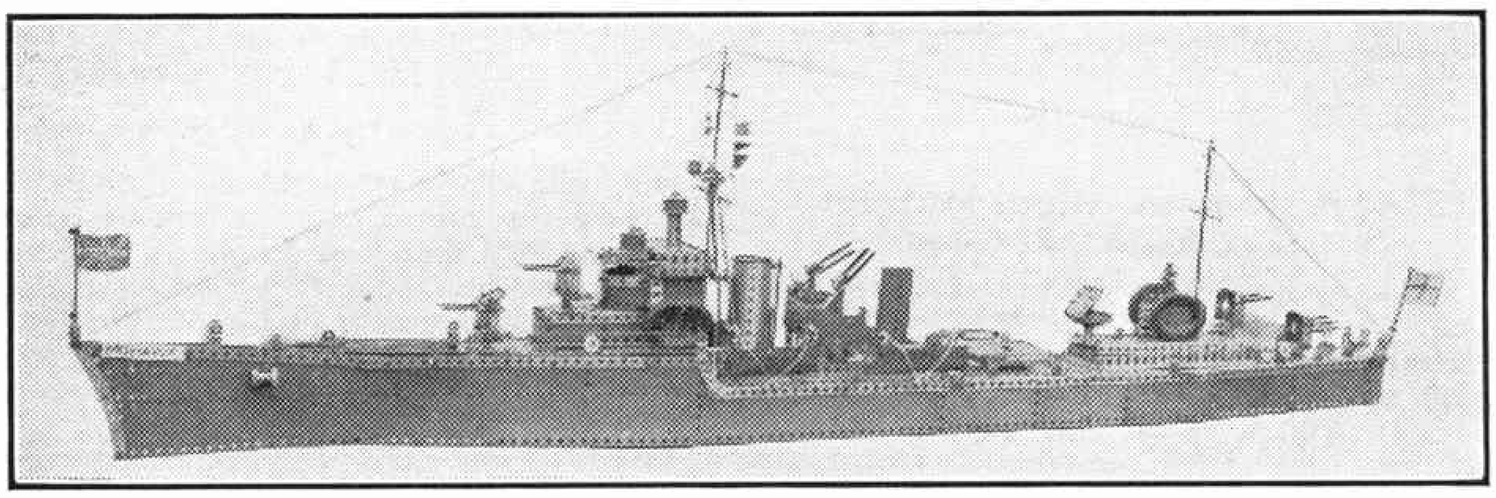
Meccano Model-Building Competitions

By "Spanner"

"Autumn" Model-Building Contest

No keen Meccano model-builder ever grumbles at the vagaries of the British climate. On the wettest day he is just as happy as on the sunniest. True, he can try out his model motor car down the garden path when the sun is shining, or he can span the path with a fine Meccano bridge, but there are even more interesting things to be done indoors when the weather is bad, and during the long autumn and winter evenings Meccano becomes even more exciting. Meccano boys then settle down to work in real earnest, looking round for "new worlds to conquer," and that is one reason why I expect a bumper entry in this month's special model-building competition. Another is that models may represent any desired subject and may be constructed from any size of Outfit or number of parts, while to add to the attractions of the contest the rules have been made as simple as possible.

Readers of any age living in the British Isles or Overseas can take part in this competition, and I advise all who enter to try and incorporate in their models some ingenious use for a Meccano part or some novel movement. Models displaying originality of this kind, no matter how simple they may be, will stand the best chances of winning the prizes.



A realistic model of H.M.S. "Mohawk" built by S. Hall, Bingley.

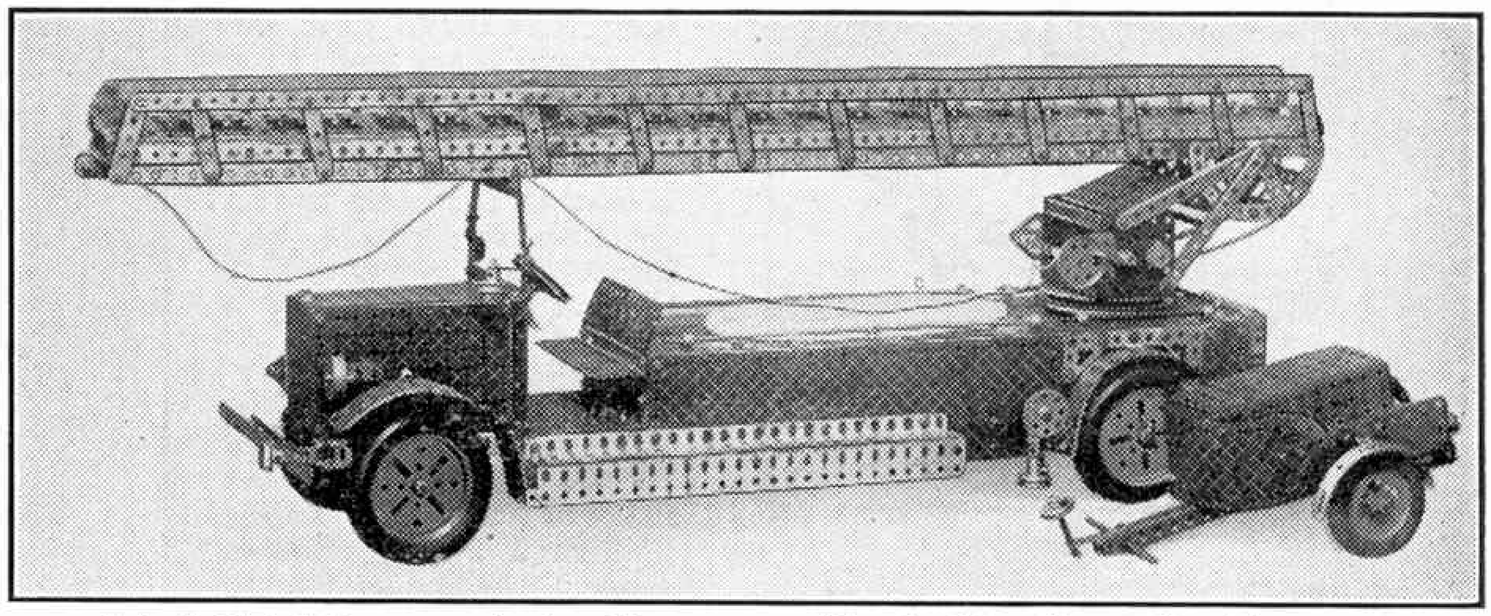
When the model is completed a photograph of it should be prepared, but if this is not possible a good sketch will do. The competitor's age, name and address should be written on the back of the illustration, and it should be sent, together with a brief description of the model, to *"Autumn" Model-building Competition, Meccano Ltd., Binns Road, Liverpool 13.*" That is all there is to do, but it should be noted that all models submitted must be the competitor's own work. The closing date is 31st December.

The following prizes will be awarded for the most interesting and well-built models submitted: First, Cheque for £2/2/–. Second, Cheque for £1/1/–. Third, Cheque for 10/6. There will also be a number of consolation prizes.

Competitors who would like to have their photographs or drawings returned to them after the entries have been judged should enclose a stamped addressed envelope for that purpose. Photographs or drawings of prize-winning entries will not be returned.

Prize-winners in our "Simplicity" Competition

The results in the Overseas section of the "Simplicity" Model-building Contest, details of which were announced in the February and March issues of the *"M.M.,"* are as follows:



C. Scott, Wakefield, won a prize in a Meccano competition for this well-proportioned fire-escape.

1st Prize, Cheque for £2/2/–: P. Yonge, Moss Vale, Australia; 2nd, Cheque for £1/1/–: J. Lusty, Masterton, New Zealand; 3rd, Cheque for 10/6: H. Charles, Edmonton, Canada.

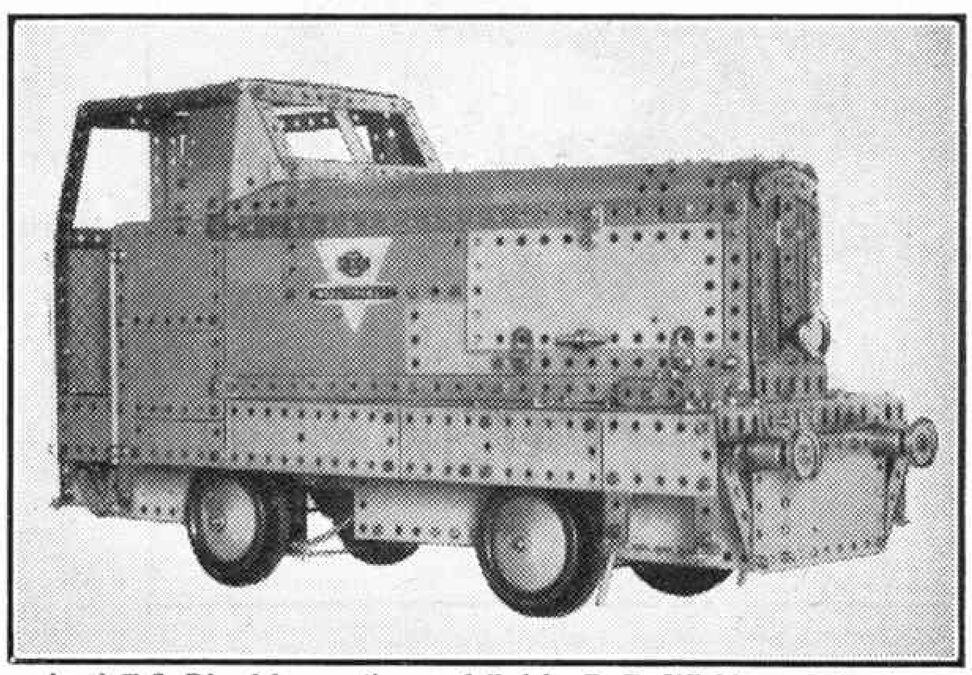
Consolation Prizes of 5/–: G. Myburgh, Claremont, S. Africa; R. Topham, Bombay; P. Smith, Capetown.

First and Second Prizes in this Contest were awarded for simple but realistic models of living creatures. P. Yonge won the First Prize with a jolly little model of a toucan, a brilliantly-coloured tropical bird that has an enormous beak. In the model the head is a Pawl bolted to a Flat Bracket and attached to a ½" Pulley that represents the bird's body. A Centre Fork held in a Collar attached to the Pulley makes a realistic tail, and a particularly novel feature is the use of links of Sprocket Chain, opened out and bent around a Rod, to represent the bird's claws gripping a perch. This model owes its success to the high degree of realism attained, which is due to a really clever arrangement of the few Meccano parts used in its construction.

Second Prize went to J. Lusty, who submitted a model spaniel dog. Two Flat Trunnions representing the head of the animal are bolted to each side of a U-section Curved Plate, and the pronounced ears peculiar to these dogs are represented by 2½" Cranked Curved Strips attached to the Trunnions. The animal's legs are 2½" Strips, and its tail also is a 2½" Strip bent to the required shape.

Third Prize was awarded to H. Charles for a sturdily-constructed model field gun, the undercarriage and shield of which are built from a 3½" Strip bolted to a Flat Trunnion that is attached to two 1½" Flat Girders overlapped. The gun carriage wheels are 1" Pulleys fitted with Rubber Rings, and they are mounted on a 2" Rod. The gun barrel, a 3" Rod, carries at its front end a Rod Connector, and a Collar is placed on it against the shield. A small Fork Piece that holds a ½" Bolt in its arms represents the recoil chamber.

A consolation prize was awarded to G. Myburgh for an interesting model of a radiogram, which is well designed but does not display any really novel use of the parts it incorporates. The cabinet is constructed from Strips and Flat Plates, and is fitted with a hinged top. The various control knobs consist of Collars mounted on Rods journalled in the plates of the cabinet, and the station dial is illuminated by a bulb supplied with current from a flash-lamp battery. The compact nature of the model may be realised by the fact that it measures only 4½" × 4½" × 3½".



An A.E.C. Diesel locomotive modelled by P. R. Wickham, Leicester.

Club and Branch News

WITH THE SECRETARY

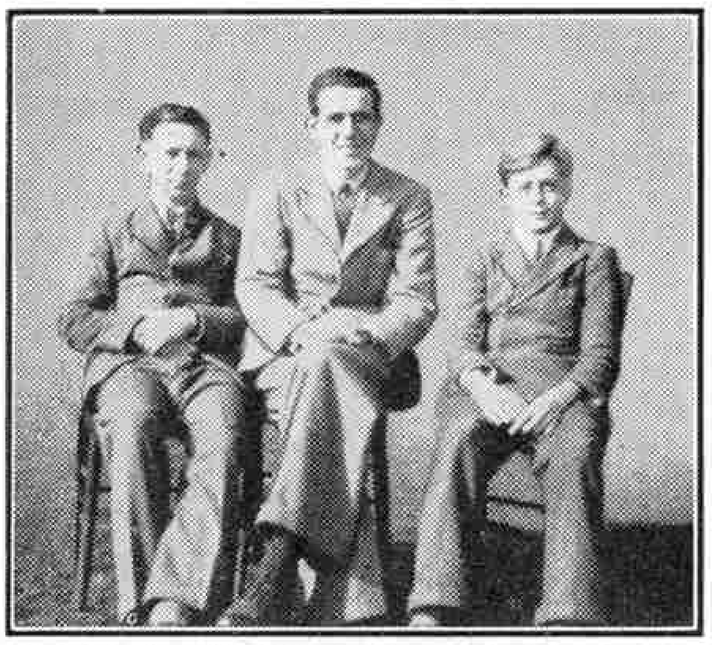
Club and Branch Photographs

Here is a message for all Clubs, new and old. Portraits of Club Leaders, Branch Chairmen and other officials, and group photographs of members appear regularly in the Magazine, and I want more Clubs and Branches to be represented in this manner. It is not difficult to obtain suitable photographs, which should preferably be at least quarter-plate, $4\frac{1}{2}'' \times 3\frac{1}{4}''$, in size. Contributions of this kind from new Clubs and Branches will be specially welcomed, but I am often able to find room for similar photographs from Clubs that have already been represented, but not recently. I urge all Leaders and Chairmen therefore to seize this opportunity of bringing distinction to their organisations. Members are always delighted when photographs of their Club or Branch appear in the Magazine, and the publication of these has a stimulating effect on recruiting.

Model-Building Suggestions

In the blackout season, when Club meetings may be short or perhaps have to be arranged for afternoons or early evenings, model-building necessarily takes up a greater proportion of time available than in normal circumstances. Perhaps the meeting period does not allow opportunities for embarking on the construction of the large models. This difficulty can be got over by arranging competitions for simple models, which give surprisingly large scope for ingenuity. Another way, which could well be adopted by Clubs in which more ambitious efforts are favoured, is to ask members to build models at home and bring them to meetings for entry in contests or for examination by other members. A competition run in this manner might be called a "Surprise Contest," for nobody knows what each member is busy with until he produces his model, complete and in working order. There is always great excitement on such occasions, each member being eager to see what others have done and going away with the firm determination to spring a greater surprise himself on the next occasion.

Another sound model-building policy for Leaders is that of entering the best models produced in Magazine competitions. All members of course are free to send in entries, but a good Club plan is to select the most original and interesting efforts, and to ask their constructors to supply photographs or drawings. If there is any difficulty in this a scheme could easily be arranged whereby all models selected for entry could be photographed at the same time, perhaps by a member of the Club who is a camera expert. The entries could then be forwarded by the Leader. This plan has been followed very successfully in several Clubs, the members of which have been highly gratified by the success of models submitted. It is a matter for great pride when a Club achieves distinction in this manner, and I am very eager to see the names of more members of Meccano Clubs in the lists of prize-winners in Magazine competitions.



Mr. T. J. Howells, B.A., Leader of the Kingston-on-Thames M.C., with G. Taylor, treasurer, on his right and W. Purcell, secretary, on his left. This Club was affiliated in April 1940. A dockyard scene has been constructed for the Club's Exhibition, and members enjoy good fun with the Club's Hornby Railway layout.

Proposed Clubs

LONDON—M. McDonnell, 24, Prestons Road, Poplar, London E.14.

GLOUCESTER—R. Wiggin, 28, Wellsprings Road, Gloucester.

Branch News

West Hunslet.—This newly incorporated Branch has a splendid layout, which has been considerably extended and relaid with steel track. The locomotive stud also has been increased, and excellent running of goods and passenger services is enjoyed. Mr. S. Booth, Chairman, worked out a timetable for representation of the Leeds-Newcastle services, and this was put into operation at one meeting. Steady progress is being made with the preparation of the Branch magazine. *Secretary:* W. Hall, 20, Addington Street, Dewsbury Road, Leeds 11.

Members of the Royds Hall Grammar School M.C., with Mr. P. V. Bates, Leader, in the centre. This Club has had an interesting career since its affiliation in October 1937, its programmes being well adapted to the prevailing conditions. Model-building has always been the central feature, the school workshop being used as a Club room, and as our photograph in the July issue shows, special attention is now paid to model aeroplane construction.

Seaton-Delaval (Northumberland). — Incorporation has now been secured and regular meetings for timetable working are being held. Members have been posted as stationmasters, yard master, signalman, etc. A special feature is made of miniature troop trains, over which exciting Dinky Toys aeroplane battles are arranged. An entire Dinky Toys army has been transported to new billets. *Secretary:* S. O'Donnell, 104, Astley Road, Seaton Delaval.

Ackworth School.—The first Exhibition held by this Branch was a remarkable success, trains being seen throughout in operation on a special layout. Over £2 was collected in aid of the Friends' War Relief effort. After the Exhibition the rolling stock and track were overhauled and taken up, as a new layout is now to be constructed and additional scenery installed. *Secretary:* J. H. Mayo, Ackworth School, Ackworth, Yorks.

Dunblane.—The signalling installation has been extended and improved, a water tank installed and a tunnel built. The scenery now includes a fort, guns and tanks, which form excellent special loads for goods working. Steps have been taken to increase the vigilance of the members acting as drivers, marks being awarded to those who work best according to signals. A Royal Train has been made up of Pullman coaches, which with the locomotive employed were specially polished and presented an attractive appearance. *Secretary:* J. Williamson, Backcroft, Dunblane.

Selly Oak (Birmingham).—Visitors are welcomed in the Branch Room, and 53 names are now recorded in the Visitors' Book. Interest during the summer months was centred chiefly on outdoor activities, including a Treasure Hunt in which all members took part and cycle runs. The layout is being extended and operations are to be carried on regularly, whatever the difficulties. *Secretary:* G. C. Jones, 12, Blackthorn Road, Bourneville, Birmingham 30.

NEW ZEALAND

Wellington West.—Senior and Junior sections meet separately, but members of each group may be visitors at the meetings of the other. Constructional work on the Hornby-Dublo layout is continuing; special nights are devoted to operations, and a regular timetable programme is always followed. General Knowledge contests have been held, and the programme and other business suggestions are the subjects of regular discussions. The Branch has celebrated its Third Birthday by an excellent display, in which operations were carried out on the newly completed Gauge 00 layout, which was about 100 ft. in length and had been electrified. *Secretary:* K. R. Cassells, 26, Sugarloaf Road, Brooklyn, Wellington.

Club Notes

Exeter M.C.—Model-building is receiving special attention, models constructed including a colliery lift, a windmill, a drawbridge crossing a moat, aeroplanes and swing boats. Club attendances in recent weeks have been among the highest on record. A special section has been formed for boys from Bristol. This is conducted on the same lines as the London section previously arranged and is meeting with success. Four cricket teams have been run during the season. Hornby Train operation and other pursuits have been carried out so intensely that a regular timetable allocating special nights for each has been drawn up. Plans are now being made for a very active winter session in the Club room and on the football field. Club roll: 100. *Secretary:* K. Addicott, 46, Ladysmith Road, Exeter.

Wakefield M.C.—A varied programme of Model-building Contests, Cinematograph Shows and Hornby Train Nights has been followed. The Branch has an excellent layout, on which miniatures of "*The Bournemouth Belle*" and other famous expresses are run. Lectures also have been arranged. A Publicity Secretary has been appointed, and a rapidly increasing Library has been formed. Club roll: 26. *Secretary:* K. Ward, 94, Alverthorpe Road, Wakefield.

Blundellsands M.C.—Meetings recently have been suspended owing to damage to the Club Room, but are to be resumed as soon as possible. In the meantime members are meeting each other and a magazine is to be started as soon as possible in order to keep them in touch with each other and with Club events. Club roll: 39. *Secretary:* J. K. Noel, 24, Lancaster Avenue, Liverpool 23.

Acton M.C.—Model-building meetings have been of unusual interest, and Competitions have been held regularly. In a Debate on "*Which is Britain's Premier Railway?*" each line was so well supported that a motion was carried that British railways are the best in the world! Representatives of the Club have exchanged useful ideas with officials of the Clapham Common Club. Club roll: 28. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

AUSTRALIA

Thebarton Technical School M.C. — The usual activities of this well established Club continue under the Leadership of Mr. E. T. H. Gibson. An outdoor meeting of special interest was a trip to Hallett's Cove, where the Leader explained the formation of purple slate. This shows grooves cut by a glacier that spread over South Australia ages ago. Club roll: 55. *Secretary:* W. Allen, Thebarton Technical School, Ashley Street, Thebarton, South Australia.

MALTA

Lasallian M.C.—Frequent air raids do not deter members from holding regular meetings. Model-building continues to be the chief activity, but model aeroplane flying, Hornby Train operation, roller skating, football and tennis also are enjoyed. Members are collecting scrap metal, torch batteries and other materials in aid of the war effort. Club roll: 42. *Secretary:* A. Caruana, Flat No. 1, Stadium View Flats, St. George's Street, Gzira, Malta.

Fun With Your Hornby-Dublo Railway

Miniature Figures and Station Arrangements

IN the very early days of the miniature railway hobby there was an almost complete lack of accessories as we know them to-day. One of the most notable features of photographs that one comes across showing early systems is the fact that there was no appearance of the "life" and bustle characteristic of stations and railway premises generally. Even when miniature figures did appear they were often of quite an unsuitable character for railway station purposes; in fact we have known instances of soldiers, small dolls or ornaments, and even Zulu warriors being used on station platforms! Nowadays of course things are very different. Even in such a small scale as that employed for Hornby-Dublo railways miniature figures of correct types in realistic attitudes are available. With them the most lifelike scenes can be arranged.

Even now however we sometimes come across instances where the use of these little people has been neglected and the appearance of the railway concerned is the poorer as a result. Sometimes perhaps we have visited a miniature system, or have been shown photographs of one, that is well on its way to being completed on which even train operation possibly is carried out but has buildings and premises generally that are devoid of "life." The trains on such a system appear to have no particular object in running, as there are no passengers for them to pick up at the stations and indeed there are no railwaymen to attend to the work.

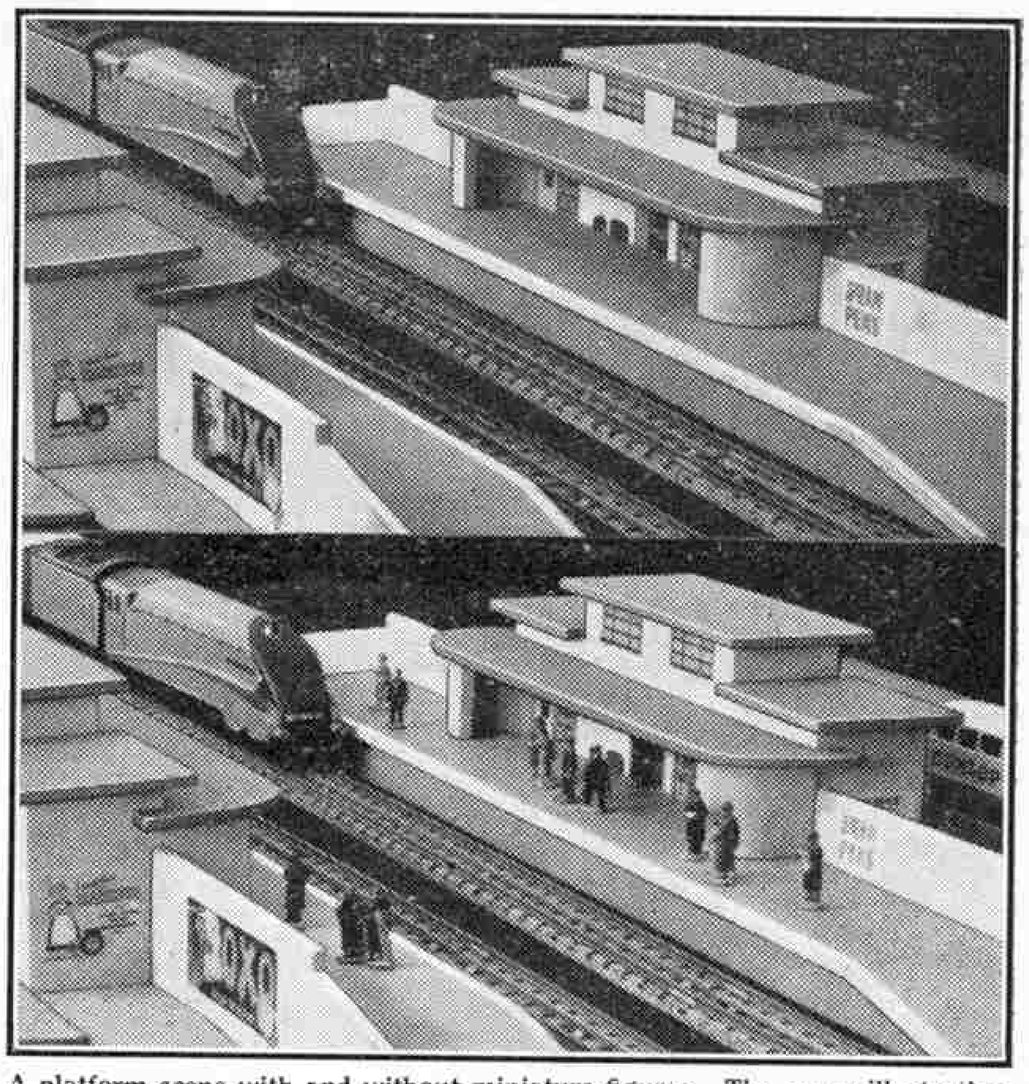
A system is "brought to life" immediately by the addition of figures such as the Miniature Railwaymen D1 and the Miniature Passengers D2 of the Hornby-Dublo range. Just what a difference can be made by them is shown in a striking manner in the two illustrations on this page. These show exactly the same situation on a station platform, the only difference being that figures have been introduced in the lower one. The upper view is quite lifeless. but the other appears to be full of movement and bustle.

Let us see who these little people are that give such a busy aspect to the scene. Taking first the Railwaymen, there is the Stationmaster in the long coat worn by officials of his grade. He has some papers in his hand, working instructions no doubt, and he is carefully watching all that goes on around him. There is the busy Porter carrying a bag or case in each hand as he hurries along the platform. He is going to load them into the van or possibly to place them in a compartment for a passenger. Alternatively he may have taken them from a train that has arrived and perhaps he will take them to a Dinky Toys Motor Car waiting outside the station. It all depends on where he is placed on the station platform and what is taking place in the way of train movements.

Then there is the Ticket Collector with hand outstretched, ready to take the tickets of Miniature Passengers leaving the station, but he will clip them with his "nippers" if the Passengers are coming on to the platform from outside. His position naturally is at the platform entrance.

The Shunters' place is in the goods yard, but he can be placed about anywhere on the permanent way where his services may be required for the coupling and uncoupling of vehicles either at stations or elsewhere. He is grasping a shunters' pole in his right hand while with his left arm he is making a hand signal, which may be interpreted in different ways according to the needs of the moment. He may be considered to be telling the driver to "ease up a bit" by waving his arm; or he may be indicating "stop" by holding his arm outstretched.

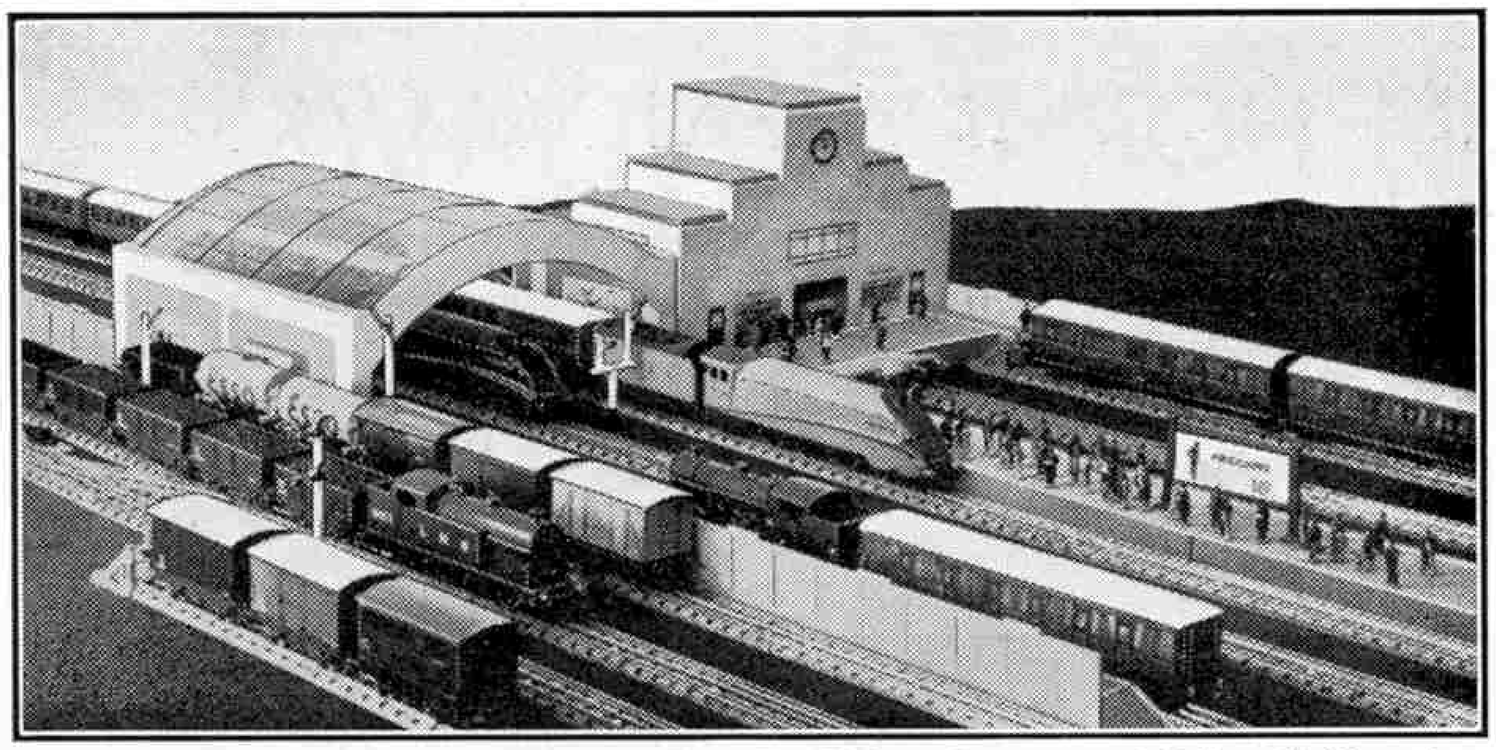
The Guard is a smartly-uniformed figure cast in the typical attitude of waving "right away" with his green flag. Although actually a passenger train guard intended for use on the station platform he can also be used in the goods yard when freight trains are starting off. Finally there is the Driver in the blue overall suit of his calling. He is a typical footplateman and actually can represent either driver or fireman standing on the platform by his engine. In addition he can be placed near his engine as it stands in the locomotive siding or yard, and several such figures also can be used to represent engine shed staff.



A platform scene with and without miniature figures. The upper illustration shows a lifeless scene, to which the addition of the figures gives the animation and realism of the lower one.

The Passengers D2 scarcely need such detailed description, as they are not concerned with the running of the trains and consequently there are few types. There are three men and three women passengers. The latter are all attractively dressed; two are simply standing as if waiting for a train, while the other is walking. All three men are standing. One is eagerly scanning a newspaper, another is just standing, with a raincoat over his arm, and the third is a golfer in correct "plus-fours" suit and has a bag of clubs with him.

A special point about the Passengers is their adaptability. They can be placed here and there about the station and if care is exercised in their arrangement most natural



An interesting through station with terminal bay lines. The Miniature Passengers and Railway Staff have been realistically arranged to form a typical crowd awaiting the arrival of a train.

results will be obtained. Some idea of the realistic grouping possible is shown in the illustration on the opposite page. If the figures are arranged in several groups with various odd persons here and there, and some of the railway staff with them rather than actually amongst them, the effect will be much better than that of a mass of figures merely jumbled together. The Passengers are also most suitable for use on the "road" side of the station buildings, where they can be placed near Dinky Toys Motor Vehicles of different kinds, as frequently suggested in these pages, or simply used to give some life to the pavements.

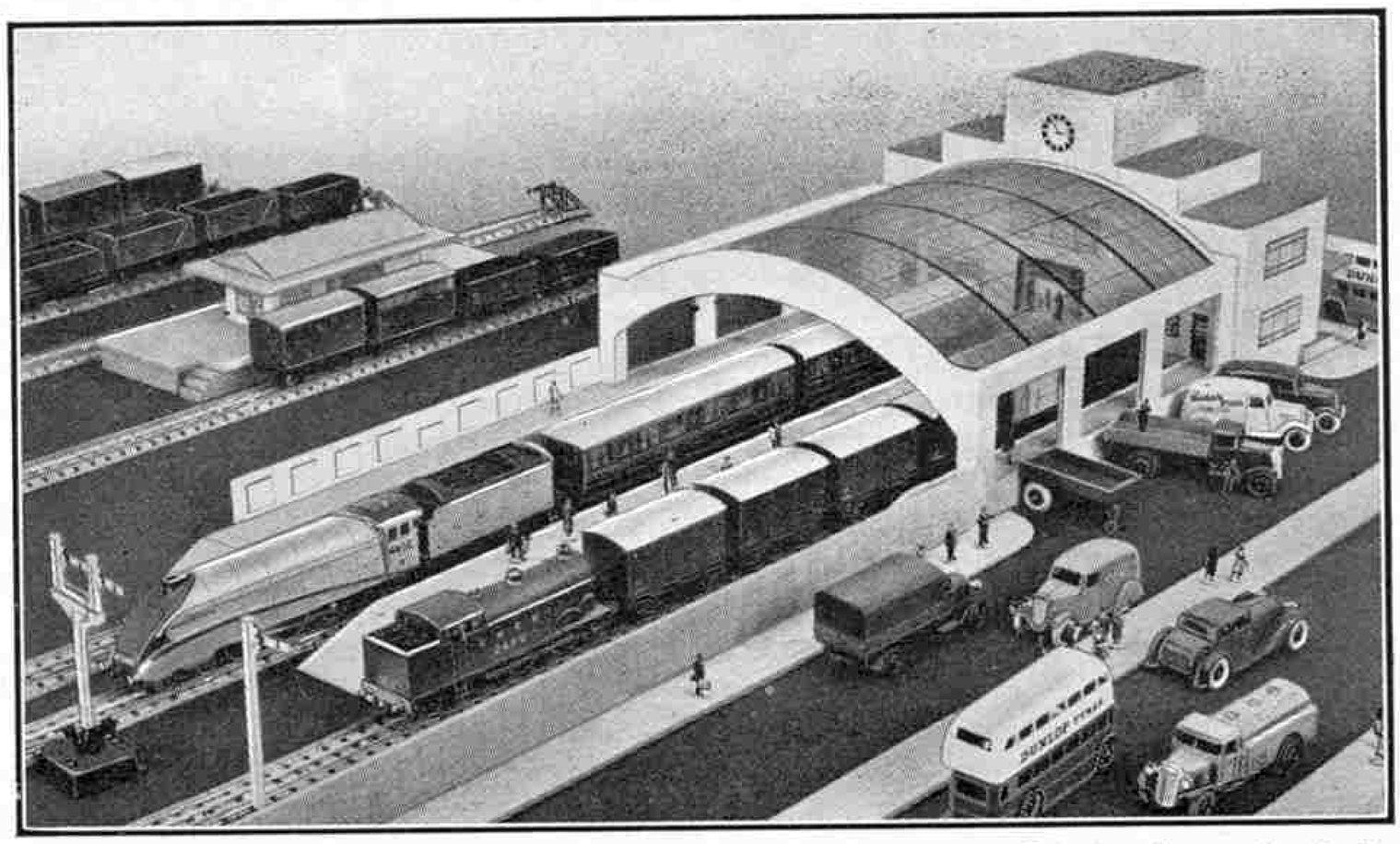
Station arrangements themselves have an effect on the realism of the line generally, as seen in the "crowd scene" illustration at the head of this page. There a splendid through main line station has been built up. At the same time additional components have been introduced to form realistic and useful terminal bay platforms. This is an arrangement of special value on many miniature systems where space, or rather the lack of it, may prevent the inclusion of both terminal and through main line stations on separate sites. Many real junction stations that have through main line tracks have terminal bays in addition. Rugby (L.M.S.) is a good example, and Crewe is another, so that the scheme is not peculiar to miniature railway practice alone.

Operations at stations arranged on this plan can be interesting, quite apart from the realism and fun obtained in securing natural life-like crowd effects and so on. Trains can commence or finish their journeys at the terminal platforms and at the same time the through platforms can be used for trains making intermediate stops. If the plan of the layout allows it a train could leave a terminal platform and pass on to the continuous main line, calling at or running past the through platforms according to the working schedule. Then finally it could complete its journey by running back into one or other of the terminal platforms.

At intermediate stops further fun is to be had in the attachment or detachment of "through" coaches, or any odd vans that may be conveyed by passenger train. In previous issues we have given details of the working necessary in such cases, and also have made suggestions regarding the type of traffic usually conveyed in this way. In the upper illustration on this page, already referred to, the engine by the near platform is moving a "through" coach that is to be attached in the rear of the express standing alongside the main platform.

Road traffic can contribute strongly to the general realism of station arrangements, and an interesting scheme is shown in the lower illustration on this page. Here the side wall of the terminal station is shown with openings that give access to the rear platform. This platform can be reserved for perishable and parcels traffic of the kinds frequently dealt with at a passenger terminus. Road motor vehicles of different kinds—Dinky Toys, of course—can then be backed up to the openings ready to receive traffic arriving in the railway vans, or to unload their freight on to the platform for conveyance by rail.

On the railway the Vans that can be handled at such a platform will include the standard vehicles for general parcels or luggage traffic, and the ordinary Delivery Vans of the Dinky Toys vehicles can be employed in conjunction with them. Then there are the special Fish and Meat Vans of the Dublo range for which suitable vehicles of the Delivery Van class can be selected. In addition Horse Box Traffic can be dealt with on the road by using the Market Gardener's Van, this resembling the livestock "float" used by the railways and by stock carriers in actual practice.



A realistic terminus and yard incorporating standard Hornby-Dublo components. Note how the openings in the near side wall of the station give access to the platform for road motor vehicles.

At ordinary "roadside" stations a goods yard will be provided if there is sufficient space available, and the Hornby-Dublo Goods Depot provides the accommodation for dealing with the incoming and outgoing traffic. It is an attractive scheme too to provide a separate siding, perhaps a spur of one Rail length only, for dealing with horsebox or cattle traffic.

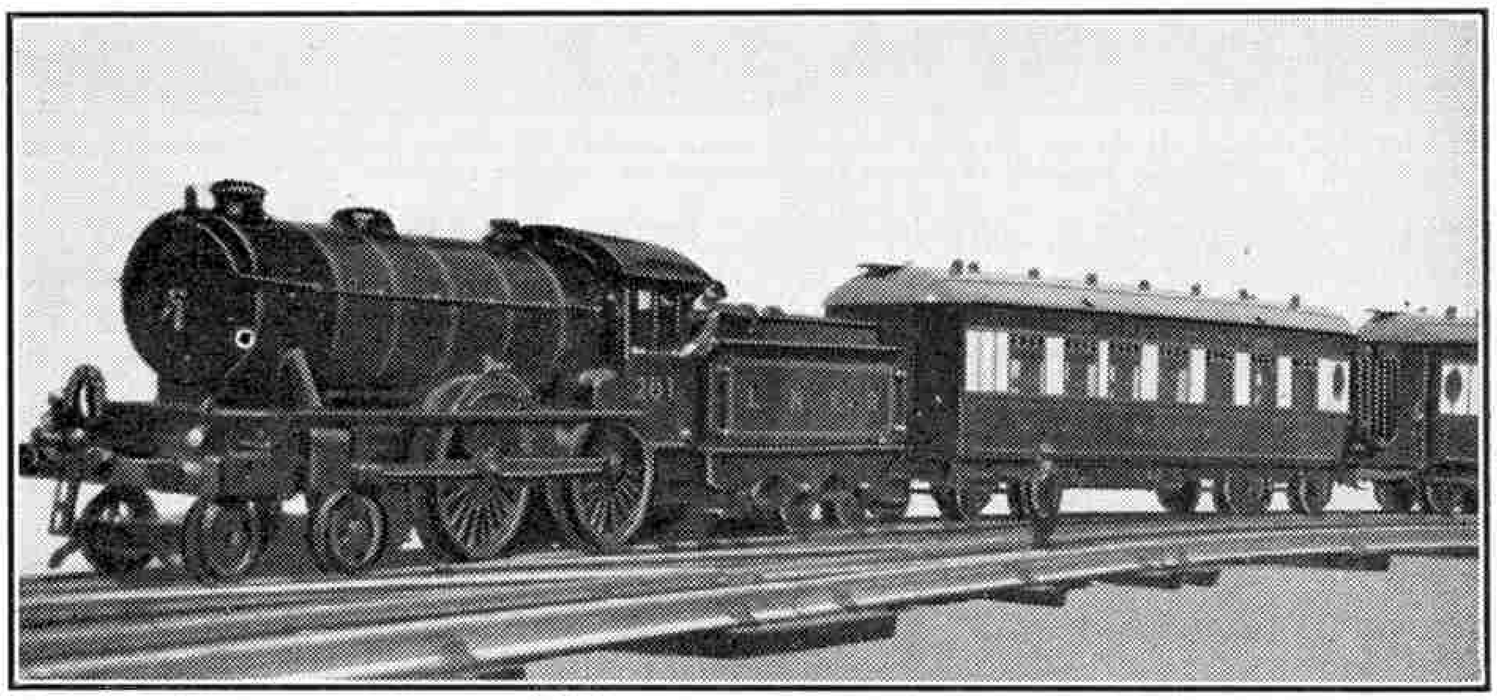
NEWS FROM HORNBY RAILWAYS

THIS month we describe developments that have occurred on two interesting layouts previously featured in the "*M.M.*," and give details of another system that have recently come to hand.

Readers will remember the "*Hebble Valley Railway*" of A. R. Wilson, Halifax, an interesting Hornby line supposedly serving a district in the West Riding of Yorkshire, that was described in the "*M.M.*" in May last. The latest news from this line indicates that the suburban electrification long projected by its "Manager" has become an actual fact, and at the moment of writing trial trips have already been run. By the time this issue is in the hands of readers it is anticipated that regular services will be in full swing. For this purpose a Hornby Metropolitan type 6-volt Electric Locomotive has been obtained, and this is shown hauling a train of Metropolitan stock in the lower illustration of this page. The Metropolitan Coaches represent joint L.N.E.R. and "*Hebble Valley*" stock.

For the present scheme a Meccano T26M Transformer is used, Resistance Controllers and Circuit Breakers also being included in the circuit between the power supply and the Hornby Electric Double Track Rails that form the newly electrified lines.

Alternatively a Meccano 20-volt Transformer and equipment can be used, the 6-volt apparatus being then "switched out" and the Metropolitan engine removed from the track. For the 20-volt system it is proposed to use a steam outline model, at first at all events. This will be a 4–4–2 tank of the former L.N.W.R. "Precursor" type that is being fitted with a 20-volt motor in the "*Hebble Valley*" "shops." This engine will be an appropriate companion to the ex-L.N.W.R. "*George the Fifth*" 4–4–0 tender engine already in use and, like it, will be supposed to have been brought from the L.M.S. when the L.N.W.R. was absorbed into that company in 1923.

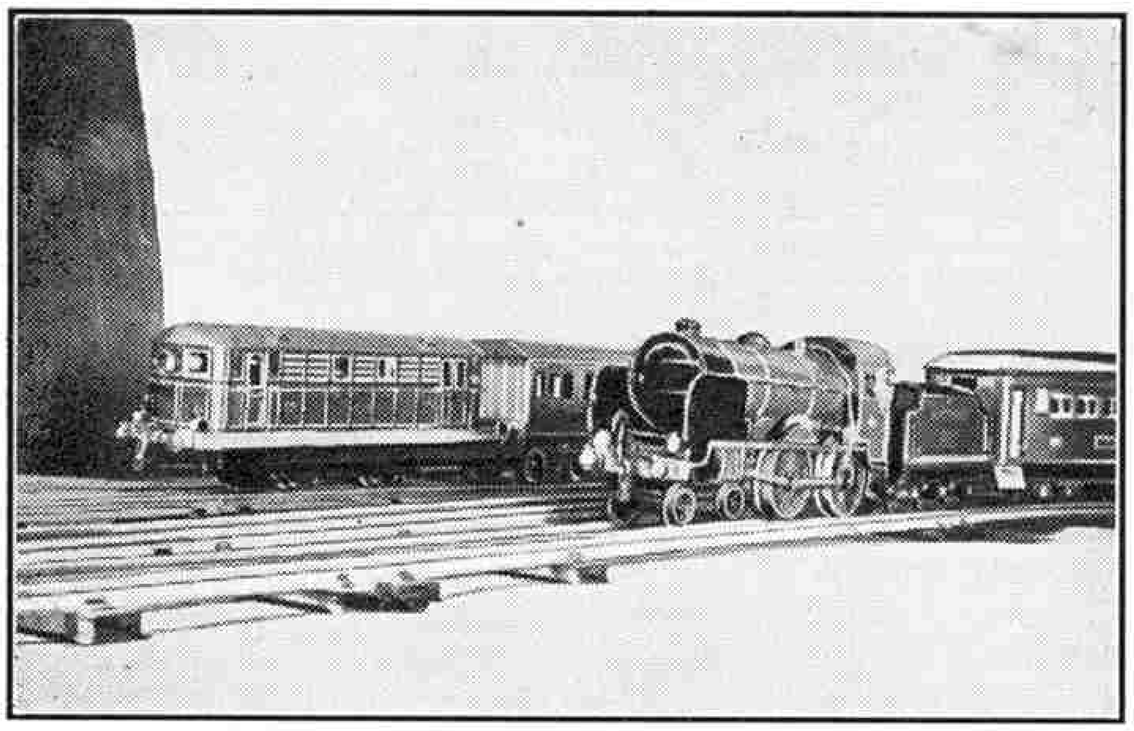


An L.N.E.R. Pullman train on the "Hebble Valley Railway" of A. R. Wilson, Halifax. The engine is a Hornby No. 2 Special "The Bramham Moor."

Another recent development has been the purchase of a "Schools" class 4–4–0, this being the popular Hornby "*Eton*" model No. 4C. At the moment it is working "*The Moorland Limited*," the best "*Hebble Valley*" express, composed of American type Pullmans that look very smart in the "*Hebble Valley*" red livery. The cars are all named after local rivers, "*Hebble*," "*Calder*," "*Ryburn*" and "*Greta*" respectively. Like the other actual "*Hebble Valley*" engines, however, "*Eton*" is to be repainted in the smart blue colour adopted by the "Company" for its passenger engines, but it will retain its lining. Finished thus and with smoke deflectors removed it will resemble the splendid blue-painted compounds of the G.N.R. of Ireland.

L.N.E.R. running powers in miniature still hold good over the "*Hebble Valley*" system, and an engine new to the district that will shortly be in service will be one of the 4–4–2 tanks of the former Great Central Railway. This, like "*Eton*," will be a clockwork engine, and another with the same motive power will be a model closely following the lines of the real "J.39" 0–6–0 tender engines. A heavy shunting tank of the 0–6–0 type has been obtained recently, but it has not been in service long enough for the "Locomotive Department" to report fully on its work.

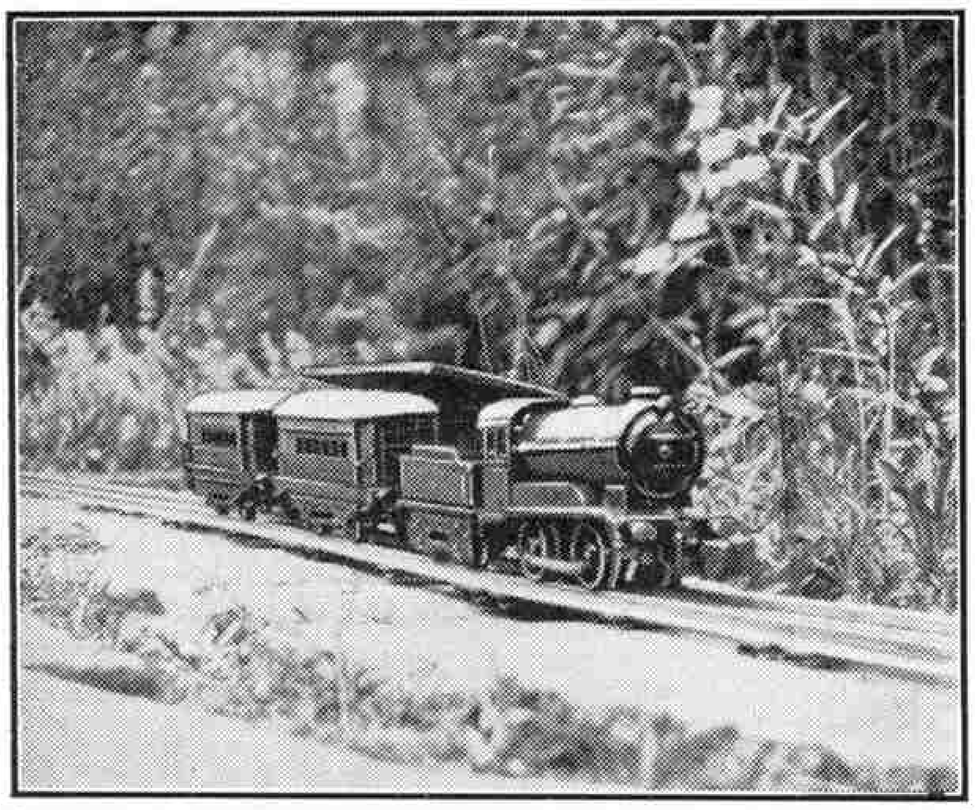
By a coincidence a similar engine is now in service on another railway that we have described before in these pages, the H.R.C. Branch layout at Blackfriars School. Actually recent developments on this line have been of the civil engineering order rather than mechanical. This is often the case with layouts that are arranged as permanent fixtures such as this, which occupies a loft. However, a double junction has been laid down turning out from the oval main line and leading to a length of track that crosses the system diagonally. It rises and passes over the main line on the opposite side from the double junction, and eventually reaches a terminus situated in another room. The ordinary points that were in use where the junction now is have been used in connection with additional sidings necessary for the large number of wagons now in use. Lineside effects in the shape of miniature buildings are constantly



Recent developments on the "Hebble Valley Railway" are shown in this illustration. "Eton," hauling "The Moorland Limited," is running side by side with a suburban train on the recently electrified local lines.

being added, and several experimental colour-light signals have been installed.

This layout, as might be expected from its situation at Laxton, Kettering, makes a special point of reproducing the operating practice of the Midland Section of the L.M.S.



A scene on the L.M.S. railway of D. L. Fytche, Crewe. The train is on its way from "Wellington" to "Christchurch."

Details are recently to hand of an interesting miniature L.M.S. system operated by D. L. Fytche of Crewe. This runs from *"Wellington"* to *"Christchurch,"* and is a non-continuous line. The upper illustration on this page shows a train on this system. There are several intermediate stations, and of these, *"Nelson Junction"* is the most important, for from this there diverges a branch line leading to *"Greymouth."* Approximately 160 ft. of track are in use, but several sidings that are proposed will shortly increase the track "mileage." The line is laid out of doors when required and is taken up again when finished with.

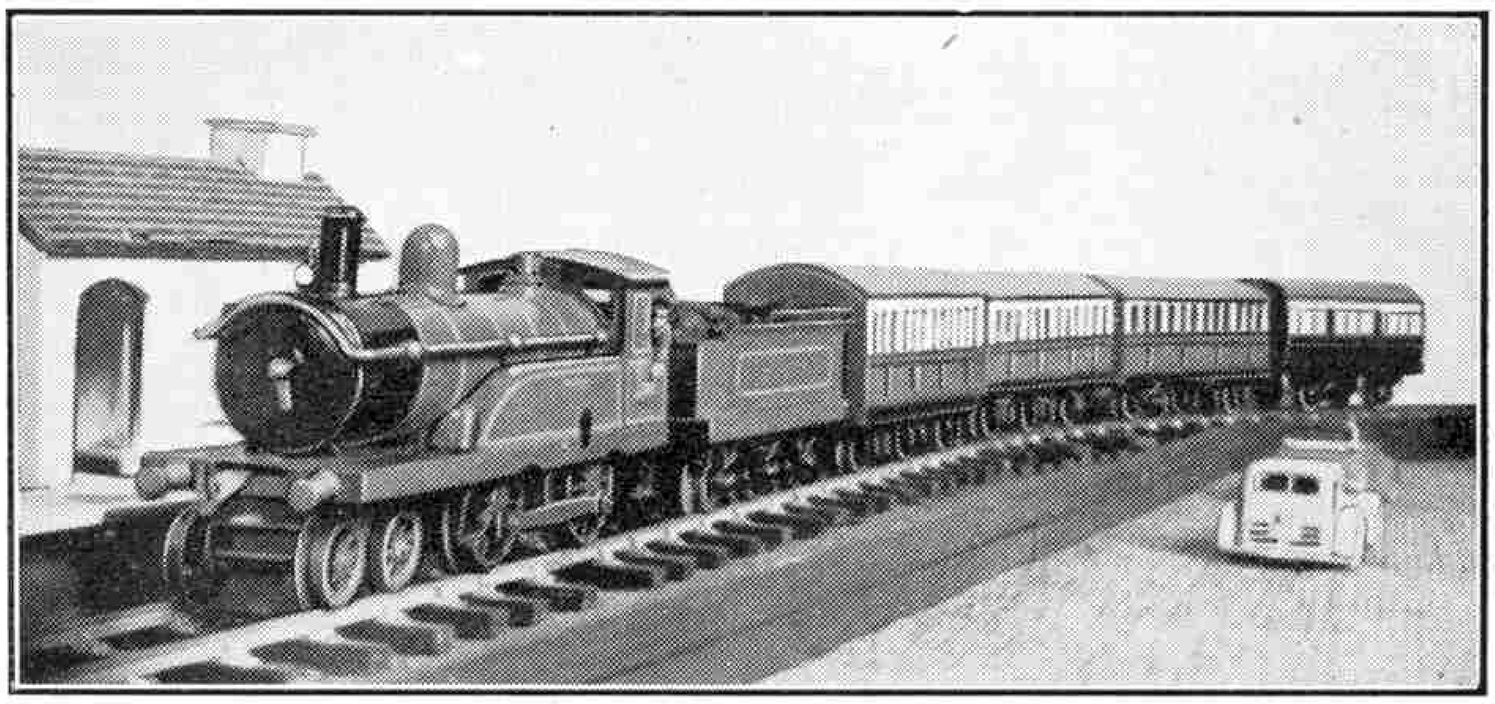
Perhaps the best way to present the line to our readers is to let the "Manager" of the line describe a journey over it in his own words: Arriving at *"Wellington,"* we find five carriages alongside the platform. Two of these are M1/2 vehicles, the next a Restaurant Car and then two No. 1 Passenger Coaches. The first two bear the destination *"Greymouth"* on them. The last three are going to *"Christchurch."* Details of the destination of the train appear on the station indicator. As we look around the station we find it is painted a warm green and black, and has a long white fence at one end. Our train leaves at 1.28 behind engine No. 3435, a Hornby M1 Locomotive, and runs slowly up the platform line over the Parallel Points at the end of the platform. There are one or two wagons in the yard.

Then we see we are on a single track, with the engine gathering speed. We negotiate a few curves and pass a sand pit and some sand hills, pass *"Arrowhead Halt"* and then *"Greystone"* station. Soon we approach *"Nelson Junction"* where there is a double track, and as we draw to a stop we alight to see what happens. The first thing we see is that it is something like the real Wellington station, only with grey, black and "dirty white" camouflage in case of enemy air attack. The first carriages of our train are uncoupled and have started to *"Greymouth."* Then a No. 1 Tank is backed on to the remaining carriages; also a Flat Truck with a Dinky Toys Boeing Bomber loaded on it is shunted on to the rear of the train. A special feature of the traffic on this system is the carriage of aircraft, and the "Flying Fortress" makes a good topical load for the Flat Truck.

The train moves off over the Parallel Points and we gather speed on a straight length of line, but we have to slow down as we go over the main line over points that take the branch line. The branch line runs parallel for a time, then swings off to the left, and we can see *"Greymouth"* station with the train alongside. Dense forest hides our view as we are swept along a perfectly straight track. Then we sweep over some points and run on to the double lines at *"Christchurch."* As we get out we see No. 500, a Hornby No. 0 Locomotive, approaching the rear of the train for the return journey. It removes the Flat Truck and aeroplane, which are taken to the siding. The aeroplane completes its journey by means of road transport. The locomotive immediately returns to the train and couples up to it. So we leave *"Christchurch"* station and proceed on our way.

The three engines mentioned, Hornby M1, No. 0 and No. 1 Tank, make up the motive power. Passenger traffic is carried in the two No. 1 Coaches and five M1 Pullmans. There are also two No. 1 Pullmans, one of which has been specially lettered on its sides *"Restaurant Car L.M.S."* as if for a wartime emergency measure. Goods stock includes milk and biscuit vans, an Open Wagon No. 1, Flat Truck and a Petrol Tank Wagon. These vehicles provide for plenty of variety in traffic working. The Open Wagon is used for the transport of coal, sand, or general merchandise, and the Flat Truck, as we have seen, has its special purpose in the carriage of aircraft. The Petrol Tank Wagon provides for the conveyance of fuel needed when the aeroplanes carried on the line are put into service.

A regular feature of the "early morning traffic" is the running of a Milk Van on the passenger trains, and sometimes "mixed" trains are operated, consisting of one or two passenger vehicles and several goods wagons. This practice is sometimes found on real branch and subsidiary lines.



A stopping train of home-made stock with a Hornby Guard's Van on the "Hebble Valley Railway." The engine is a veteran Hornby No. 2 Locomotive rebuilt to resemble an old prototype.

All the stations and various lineside features have been made at home of wood. The setting of the line in its outdoor situation is picturesque, natural scenery being provided. One feature that is unusual in model railway practice is that the timetables, by means of which all the operations are conducted, are revised monthly.

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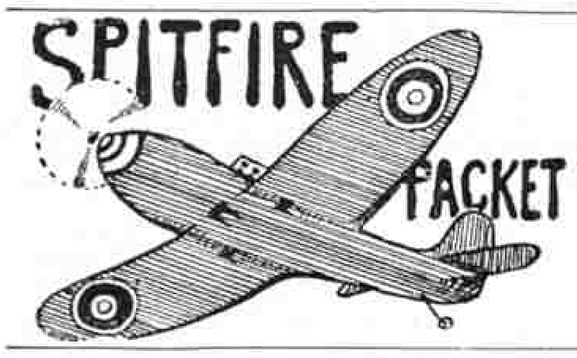

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For other stamp advertisements see page viii

STAMP COLLECTING

The War Stamps of Russia—II

IN our last issue we illustrated some of the earlier stamps depicting the strength of the Russian Forces. Coming to more recent days, an important issue of war stamps appeared in January 1935 with the title "Anti-War Series." There were five stamps in this series and each bore the commemorative dates "1914-1934" to mark the passing of the 20 years since the outbreak of the European War.

The lowest value, 5 kopecks, is by far the most forbidding in this series. It depicts a salvo of bombs falling from clouded skies on to a great city, a feature of modern war with which we have become unpleasantly familiar during the last 12 months. Beneath the design, in Russian, is the simple inscription *"War Clouds."* The highest value, 35 k., shows two Russian infantrymen, one of the men of 1914 and one of the army of 1934, clasping hands across the outstretched body of "Death." The inscription is *"Comradeship."*

The three remaining values are equally striking. The 10 k. shows a group of peasants fleeing from a burning village, an apt illustration of the "scorched earth" policy adopted by Russia in the present war. The 15 k. and the 20 k. are symbolical. The former contrasts the states of peaceful profusion and devastation under the inscription *"Before War and After"*; the 20 k. is inscribed *"Ploughing with the Sword,"* an expression of Russian hope that the day is near when swords and all other instruments of war may be scrapped and their metals used for peaceful pursuits. Specimens from this series have been illustrated in the *"M.M."* since the outbreak of war and for that reason we have not included any among the designs illustrating this article.

In its earliest days the Soviet Union banned the Boy Scout movement, contending that its aims were militaristic. Instead Pioneer Corps were formed for the purpose of training boys and girls to become useful and peaceful citizens. A short series of five stamps, issued in June 1936 to publicise the work and training of these organisations, might well be included among the "anti-war" stamps, for they carry an underlying hint that even the children of Russia are organised for peace. The five designs were as follows: 1 k. and 2 k., pioneers fitting a letter box to the door of a house; 3 k. and 5 k., pioneer preventing another child from throwing stones; 10 k., pioneer disentangling a kite from a telegraph line; 15 k., girl pioneer saluting.

Next series of interest is the December 1937 issue commemorating the Air Force Exhibition. There are six stamps in this series, each bearing a design showing a low wing Army Co-operation monoplane and an army motor cyclist. Then came the 20th anniversary of the formation of the Red Army, marked in June 1938 by the issue of seven stamps illustrating a variety of army types. The 10 k. shows an infantryman on sentry duty, and in the background a thumbnail sketch representing a tank, a heavy field gun and a battleship. The 30 k. features a sailor of the Soviet Navy, and the 40 k. an airman. All three stamps are illustrated here. Of the remaining values the 20 k. shows a tank driver and the 50 k. an artilleryman. Perhaps the best design of the series if the 1 r., which depicts a machine gun crew in action. The other stamp, 80 k., shows a picture of Stalin reviewing a cavalry unit. Each stamp in the issue has the flag of the Soviet Union in the background of the design.

Perhaps the best of all Russian series illustrating Army types is one that appeared in January of this year. This consists of seven stamps, six of which are illustrated on this page and on page 330. The 5 k. shows a detachment of ski troops on scouting patrol across snow-covered country. The 15 k. value shows a field gun in action, and the design is specially interesting for the simple idea it affords of the effectiveness of light natural camouflage. The introduction of a few tree branches around the wheels and gun carriage makes it difficult to pick up the lines of the gun at first sight. The 30 k., showing infantrymen on parade, is also of special interest in that it is the first stamp in which the automatic gun is shown.

The cavalryman shown on the 45 k. value is an interesting reminder that Russia still retains cavalry units in her army, and that much of the ground over which an invading army would be required to fight is completely unsuitable for the operation of mechanised units. The 20 k. value, not illustrated, shows a cavalry troop in files of threes. The 50 k. stamp of this series shown a bomber pilot against a background of engine nacelles, holding a map of country across which he is about to fly. The high value, 1 r., is a simple design showing the five-pointed star, insignia of a Marshal of the Russian Army and the National Emblem of the Soviet Union.

Our last illustrations in this story of Russian preparedness for war are from the series issued in February last to show the high state of Soviet industrial organisation. The nominal purpose of the series was to commemorate the tremendous success that had attended the "Stakanov" seven-year plan for the re-organisation of Russian industry, but the stamps have their place in this story since without effective industrial effort no war can be successfully waged in this era of mechanisation. Each of the designs is a striking picture of a nation at work. The 10 k. shows two colliers returning from the pithead, the 20 k. the triple crossing by road, canal and railway over the Moscow-Volga Canal, and the 50 k. a farm co-operative unit at work. These three stamps are illustrated here. Of the others the 15 k. depicts a modern blast furnace, the 30 k. shows new types of railway locomotives and the 60 k. an allegory of the important part played in industry by ball-bearings. The seventh design, on the 1 r. value, is an interesting view of an oil-field showing the usual typical assembly of derricks and refineries.

It will be seen that there is real interest for the collector in the war stamps of Russia. These are thoroughly up to date in their designs and realistic in their recognition of the horror of modern warfare, and they also seem to have conveyed a grim warning of the reception that aggressors would meet.

New Collectors' Corner

What Stamps Shall I Collect?

Last month we gave the beginner advice on the equipment that he should obtain when he begins stamp collecting. This month, as promised, we turn to the stamps themselves.

Most new collectors secure the greater part of their stamps from friends; they cannot pick and choose among such gifts. That in part provides the answer to the question so often put to us by readers about to start stamp collecting: Should I make a general collection, or should I specialise in the stamps of just one or two countries? To those who ask this question our advice is always the same. Collect everything that comes your way, until such time as you find that you have acquired a specially keen interest in a particular country; then concentrate on that. In the meantime, if you wish to buy stamps, it is a good plan to concentrate your purchases on stamps bearing one type of design or having a similarity of subject, such as birds, or bridges, or railway engines, or animals.

A collection of specialised subjects is always fascinating and rarely costly. We know several very keen philatelists who possess valuable collections specialising in one country, but who also possess a subject collection to which they turn for relaxation from the intricacies of advanced philately.

One topical subject that should appeal to collectors just starting the hobby would be "Stamps with a War Interest." This collection should include only stamps illustrating modern methods of warfare and places and people that have figured in the present war. For example, just before commencing to write this column, we read that the Russians had bombed the famous Cernavoda Bridge over the River Danube and thus cut the pipeline that carries oil from the Roumanian oilfields to the Black Sea ports. An excellent view of this bridge appears on the 10 and 20 lei stamps of Roumania's 1928 issue. We read also that the R.A.F. had bombed Cologne for the 100th time. A view of Cologne Cathedral is shown on the 10,000 marks value of Germany's 1923 issue.

There are many points of importance additional to those mentioned here that the new collector might watch to his advantage, and we hope to discuss these in further articles in this column. Readers may have ideas of their own. They may also have stamps they cannot identify, or they may encounter problems that they cannot solve for themselves. Whatever their troubles they are invited to write to the Editor for assistance.

Stamp Gossip

and Notes on New Issues

A War Novelty

War conditions have produced many interesting stamps, but none has possessed the interest of the temporary series placed on sale in Kenya, Uganda and Tanganyika on 1st July. This series consists of the 1d., 3d. and 6d. values of the current South African bi-lingual stamps overprinted with new values, 5c., 10c., and 20c., respectively, and the inscription *"Kenya, Tanganyika and Uganda"* in three lines.

The explanation is that, following the loss through enemy action of a consignment of stamps to replenish stocks in these East African territories, the Postmaster-General of Kenya foresaw a possible shortage of the three values mentioned. In consequence he applied to the South African Government for supplies of South African stamps that could be overprinted to meet the possible emergency. The overprinted stamps were, in fact, lying in stock in Nairobi for some months before the necessity to issue them arose.

There have been many instances of stamps of another country being imported and overprinted for use elsewhere, but usually the reason has been a change of administration. Germany sent its own stamps, suitably overprinted, into Belgium during the last war. Another example of a different kind is the overprinted Indian issue used in Burma in the early days of its independent administration. The reason was that Burma had always previously been accustomed to use Indian stamps, since it came under the administration of the Indian Government, and the overprinted stamps merely did duty pending the introduction of a definite series of Burmese design. This new Kenya issue is the first example of one country borrowing the stamps of another and overprinting them to meet a shortage of its own issues. It is another illustration, and an important one, of wartime difficulties.

Swedish Bible Commemorative Issue

The quadricentenary of the introduction of the Bible into the Swedish language was commemorated in Sweden in May last by the production of special 15 and 90 ore stamps.

This Bible of 400 years ago was named Gustavus Vasa's Bible, and it has been Sweden's practice to name all its great Church Bibles after the monarch reigning at the time of introduction. It was the first complete translation into the Swedish language. There had been sectional translations earlier, but none of these had been in pure Swedish. The stamps commemorate more than the Bible anniversary, for they mark too the the foundation of the modern Swedish tongue, on the development of which the translation exercised a profound effect.

The design used for both stamps shows the translators, believed to be the brothers Olaus and Laurentius Petri, although history provides no exact record, presenting the first impression of the newly-printed work to the King. It is based on a painting, dating from the 1830s, that is preserved in the Gustavian Mausoleum at Upsala Cathedral.

The Whitfield King 1942 Catalogue

The 1942 Whitfield King Standard Catalogue, the 41st annual edition of this old favourite, has now been published. It is especially useful to young collectors, for it includes important water-mark and perforation details, but avoids minor varieties that can be so confusing to beginners. This year's edition is larger than any of its predecessors, containing more than 1,000 pages and nearly 8,000 illustrations. All the usual features that have made it so valuable are included, but the shortage of paper has made it necessary to reduce the number of copies printed, so that any collector who wishes to obtain one should take the necessary steps to this end immediately.

Every stamp issue since 1840 is listed in the catalogue, the total number being 72,780, an increase of 1,558 compared with that in the 1941 edition. An interesting feature is the inclusion of new stamps issued during the past year in foreign countries, which at present cannot be obtained in this country. These have been recorded for information only, as full details and illustrations are unobtainable.

* * * *

We are indebted to the courtesy of the Editor of "Stamp Collecting" for the loan of the blocks illustrating this month's stamp pages.

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Can You Complete These Advertising Slogans?

Here is a competition in which every reader can join with the greatest zest. It is concerned with advertising slogans, which he sees every day in newspapers, on posters and elsewhere. They have indeed become so familiar that many of them are quoted regularly in every-day conversation, especially those in which the name of the product itself does not appear.

In the panel in the centre of this page is a list of 25 slogans, all of which will be well known to the average reader. He may not recognise them at first, as essential words, including the names of the products where these form parts of the slogans, have been missed out. What he is asked to do in the competition is to fill in the missing words. In certain instances this will be very easy. For instance the first slogan in the list obviously is *"Beef in Brief"* the "Brief" providing the necessary clue. Other slogans may be a little more troublesome to discover, but it will be great fun to track them down, and those who do not recognise them on inspection can always find examples of slogans in the places already mentioned, among which the one for which they are looking may easily be prominent. In fact, an excellent way to complete the list is to take a walk around the streets of a town, looking at the posters on hoardings and in the shop windows. An elusive slogan may very well be brought to light during a stroll of this kind.

1. – – **brief.**
2. **Keeps** – – **fit.**
3. – – **Soaps, Soap** – –
4. – **can** – **sure** – –
5. **Fit** – –
6. **Make** – – – **banquet.**
7. **Golly** – – **!**
8. **For** – – **energy.**
9. – – **everything.**
10. – **for radiant** –
11. **You** – – **the** – **in** –
12. – **Pinking.**
13. **A** – – – **moment.**
14. **First** – – **for 2d.**
15. – – **energy.**
16. – – – **that counts.**
17. – **for** – **;** – **for** –
18. – **lines** – **the** –
19. – **of** – **road.**
20. – – **shoes** – **longer.**
21. **Best** – – **it.**
22. **Worth** – – **a** –
23. – – **better.**
24. – **demand** – – – **daily.**
25. **Fit** – – – **satisfied.**

When as many slogans as possible have been dealt with in this manner a list should be prepared in the order given in the panel. The list should be written out on a postcard and forwarded to *"Advertising Slogans Contest,* Meccano Magazine, Binns Road, Liverpool 13."

Prizes to the value of 21/–, 10/6 and 5/– will be awarded to the senders of the three best solutions in order of merit. In the event of a tie for any or all of the prizes the judges will take into account the neatness or novelty of the entries concerned. Entries must reach this office not later than 31st October. Consolation prizes also will be awarded, so every competitor should send in his list, even if one or two slogans baffle him.

There will be a separate section of this contest for readers living overseas, and the prizes in this section will be of the same value as those in the Home section. The Overseas closing date is 28th February 1942.

CHOOSE YOUR ROUTES

Every railway enthusiast enjoys poring over railway maps and our competition this month will give splendid scope for all who indulge in this form of entertainment. Below we give a list of journeys that we ask readers to imagine they have to make, and we wish them to give in each case the route that they would choose between the two stations named.

Some of the journeys involved are straightforward and can easily be made by recognised cross-country routes. Others are not quite as easy as they look, for there are no direct connections, and changes of line and company will have to be made. In some instances alternative routes will be available. Competitors should give these, and for all journeys they should state also the principal points passed through and name the places at which they would change from one line or company to another. They are not asked to give the actual train services and connections.

In order to make this quite clear we may take the first example in our list. In this instance. the starting point is Liverpool and the destination is East Linton, in East Lothian, Scotland. The best route to follow is from Liverpool (Exchange) to Carlisle, via Preston and Lancaster. At Carlisle a change is made to the L.N.E.R. "Waverley" route to Waverley Station, Edinburgh, whence a train is taken to East Linton. Alternative routes would take the traveller to Newcastle, either by crossing to that city from Carlisle or by travelling there from Liverpool via Leeds or York, and from Newcastle proceeding through Berwick and Dunbar.

The journeys selected for this contest are: **Liverpool to East Linton; Dover to Holyhead; Bradford to Dundee; Bristol to Barnsley; Manchester to Wisbech; Berwick to Oban; Penzance to Edinburgh; Littlehampton to Chatham; Plymouth to Brighton; Derby to Llandudno; Salisbury to Burnham-on-Sea; Newcastle to Bournemouth.**

This contest is open to every reader of the *"M.M."*, whether he is a member of the H.R.C. or not. There will be prizes of 21/–, 10/6 and 5/– respectively for the three most meritorious efforts, and in addition there will be consolation prizes for entries that approach prize-winning standard. Similar awards will be made in the Overseas section.

The address to which the efforts of competitors should be sent is *"Route-Finding Contest,* Meccano Magazine, Binns Road, Liverpool 13." Entries in the Home section should reach this office not later than 31st October and those in the Overseas section by 28th February 1942. Every entry must have the competitor's full name and address on it.

October Photographic Contest

This month we announce another photographic competition in which prizes are offered for the best photographs submitted. There are two conditions—1, that the photographs must have been taken by the competitor; and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired. We remind readers that they must not photograph any features of military importance.

Entries will be divided into two sections, A for readers aged 16 and over, B for those under 16, and prizes of 21/– and 10/6 will be awarded in each section for the best entries, together with consolation prizes for other good efforts.

Entries in this month's competition should be addressed *"October Photo Contest,* Meccano Magazine, Binns Road, Liverpool 13," and must reach this office not later than 31st October. Overseas closing date, 28th February 1942. Competitors must state their ages.

COMPETITION RESULT

August Photographic Contest (Home Section).—First Prizes: Section A, divided, A. G. DELL (London S.E. 27) and W. BARR (Birkenhead); Section B, S. A. S. SHRIMPTON (Llandudno). Second Prizes: Section A, J. C. NEEDHAM (Enfield); Section B, D. C. FINLAY (Glasgow W.4); Section A, Special Prize, S. S. PETHYBRIDGE (Newton Abbot). Consolation Prizes: P. R. WICKHAM (Leicester); P. TAYLOR (Kettering); A. ROSE (Ulverston); M. W. TAYLOR (Southall).

An Aircraft Locator Apparatus

(*Continued from page 321*)

to the Rack Strip 5. The 4½″ Rod on the left is also attached to a 4½″ Strip 7, to which is glued a scale graduated in units of thousands of feet. On this scale the distance representing 1,000 ft. is made equal to that representing a mile on the map.

This unit can be moved up and down by turning a 1″ Gear 8 attached by means of a Socket Coupling to a ½″ Pinion, the entire unit being free to rotate on the Screwed Rod 6. The ½″ Pinion meshes with a 57-teeth Gear fixed to a 2″ Rod that carries also a ½″ Pinion engaging the teeth of the Rack Strip 5. The sight rod 9 is an 8″ Rod pivoted at its rear end and inserted in a Collar lock-nutted to a Flat Bracket. This Flat Bracket is fixed by a Threaded Pin that forms a pointer for the vertical scale, to the 2″ Strip of the movable unit. The sights 10 and 10a consist of pieces of thin wire.

The Coupling attached to Corner Brackets 4 is moved along Rods 3 by turning a 1″ Gear Wheel 11. The Rod of this Gear carries also a ½″ Pinion that meshes with the teeth of a 6½″ Rack Strip.

The path of the aeroplane is traced on the map by a 1″ Screwed Rod held in a Threaded Coupling that is free to slide on the lower 11½″ Rod, but is fixed by a 1″ Screwed Rod to a 4½″ Angle Girder bolted to the left Corner Bracket 4.

To operate the instrument the height of the plane is roughly estimated and the pointer set to that height on the vertical scale. The plane is then held constantly in the sights by adjusting the Gear Wheel 11 and swivelling the carriage on the base.

Thirty Fathoms Deep

COMMDR. ELLSBERG

The exciting story of a private expedition to recover treasure from the famous sunken galleon *Santa Cruz*. The thrills and dangers of deep sea diving are founded on the author's own experience as a U.S. Navy diver.

Illustrated 5/– *net*

He went with Christopher Columbus

L. ANDREWS KENT

A story as exciting as *He Went With Marco Polo* by the same author. Peter Aubrey, who sails in Columbus' ships, is an English boy.

Illustrated 6/– *net*

HARRAP BOOKS

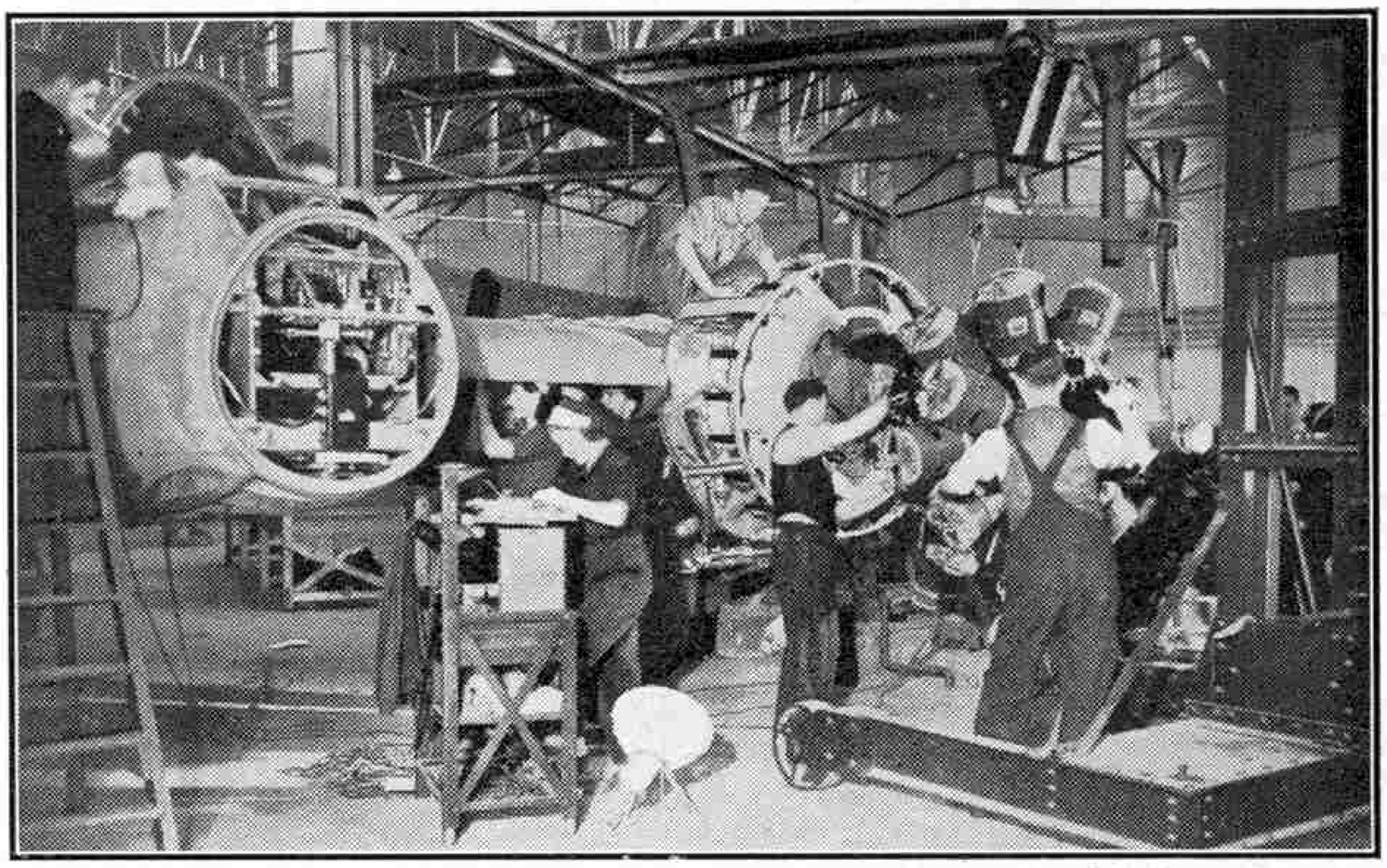
Life-Boat Gallantry on the East Coast

The Royal National Life-Boat Institution has awarded seven medals, eighteen vellums and £117 to the coxswains and crews of five of its life-boats for going to the help of six steamers which had stranded on the Haisborough Sands in a north-westerly gale.

The first life-boat to be called out was the Cromer No. 1 boat, under the command of coxswain Blogg. She reached the sands at 10 o'clock, to find the first vessel almost submerged. The coxswain drove the life-boat right over the submerged deck and into an opening in the upper works. Heavy seas broke over her, and twice she bumped heavily on the deck of the steamer, but the coxswain held her there until the 16 men who remained of the steamer's crew had been hauled into the life-boat. She then went alongside a second steamer and rescued 31 men, proceeding immediately to the help of a third steamer, of which only the bridge was above water. The coxswain again drove the life-boat right over the bulwarks and submerged deck, and held her against the bridge, until the 19 men of the steamer's crew had jumped aboard. Not content with these achievements, the coxswain took his life-boat alongside a fourth vessel, at a point where the water was so shallow that she was bumping on the sands, but there she was kept until the crew of 22 had jumped into her.

The life-boat had now rescued 88 men and was herself badly damaged, with three holes in her side, and the greater part of her stem and fifteen feet of her fender torn away. Meanwhile the Cromer No. 2 life-boat had arrived and had rescued eight lives from the fifth steamer, and the Great Yarmouth and Gorleston life-boat had rescued 23 from the sixth steamer. The Lowestoft and Sheringham life-boats also came out, but arrived to find that the rescue was finished.

For these splendid rescues the gold medal of the R.N.L.I., the V.C. of the life-boat service, was awarded to coxswain Blogg, who has now won it three times, and six bronze medals were presented to other members of the crews, in addition to the money awards already mentioned.



Mounting "Bristol" Hercules engines in a "Bristol" Beaufighter. Each of these air cooled, sleeve-valve engines develops over 100 h.p. from each of its 14 cylinders. A special article on the Beaufighter was published in last month's "M.M." Photograph by courtesy of The Bristol Aeroplane Co. Ltd.

COMPETITION SOLUTIONS

MARCH "RAILWAY JOURNEY" CONTEST

The starting point of the railway journey described in our story was Newcastle, on the L.N.E.R., and the train consisted of L.M.S. stock hauled by a G.N. "Atlantic." The route passed through Durham and Darlington to York, where the engine was replaced by an L.M.S. "5PSF," and then southward to Chaloner Whin Junction. There the train branched off the main line of the L.N.E.R. in order to reach Normanton, and the main line of the former L. and Y., passing through Wakefield, Todmorden and Summit Tunnel to Manchester (Victoria Station). From Manchester the route led through Atherton, Hindley and Orrell to Exchange Station, Liverpool, which is also the terminus of the electrified line from Southport.

Most of the competitors were correct in almost every respect, and it was not easy to decide on the prize winners. The most common mistake of unsuccessful entrants was to make the train run from York to Leeds instead of Normanton, and thence to follow the former L.N.W. line to Manchester (Exchange) and Lime Street, Liverpool. A few competitors went rather sadly astray, sending their trains to wrong destinations by extraordinarily devious routes. One went to Blackpool via Preston, and another took his train over to the Wirral Peninsula, on the opposite side of the Mersey to Liverpool, presumably to work an electrified line into the picture. The record however was created by the entrant who sent his train all the way to Portsmouth, via Derby, Birmingham, Gloucester, Bath and the Somerset and Dorset line!

April "Jumbled Names" Contest

1. WEBB; 2, BULLEID; 3, BRUNEL; 4, CUBITT; 5, JESSOP; 6, WHALE; 7, MANSON; 8, PARKER; 9, BARKER; 10, BLENKINSOP; 11, TREVITHICK; 12, HUGHES; 13, URIE; 14, BRASSEY; 15, GOOCH; 16, KIRTLEY; 17, FOWLER; 18, COLLETT; 19, STROUDLEY; 20, POLLITT; 21, HACKWORTH; 22, ASPINALL; 23, VIGNOLES; 24, GRESLEY.

COMPETITION RESULTS

HOME

June "Letter Square" Contest.—1. D. A. JARMAIN (London N.22); 2. G. L. BARROW (Bewdley); 3. K. NAYLOR (Halifax). Consolation Prizes: E. L. BARRAS (Richmond); F. MILLS (Kearsley); G. ROBERTS (Liverpool 11).

June "Photographic" Contest.—First Prizes: Section A, J. S. MOUNT (Sedbergh); Section B, R. G. WYATT (Liverpool 19). Second Prizes: Section A, D. C. FINLAY (Glasgow W.4); Section B, M. W. TAYLOR (Southall). Consolation Prizes: J. M. ADKINS (Bristol); E. L. CROOKS (Sheffield); W. J. GILLARD (Sherborne); S. S. PETHYBRIDGE (Newton Abbot).

June "Jumbled Tunnel Names" Contest.—1. D. H. EARLE (Wembley Park); 2. R. J. TREDWELL (Wolverhampton); 3. G. F. STOREY (Edinburgh 5). Consolation Prizes: H. J. BUCKINGHAM (Bletchley); J. G. H. ELLISSON (Gravesend).

July "Hidden Train Names" Contest.—1. C. E. WRAYFORD (Bovey Tracey); 2. H. T. BUCKINGHAM (Bletchley); 3. W. G. NURSE (Llanelly); Consolation Prizes: B. C. BINGHAM (West Harrow); G. E. ROBINSON (Birmingham 8).

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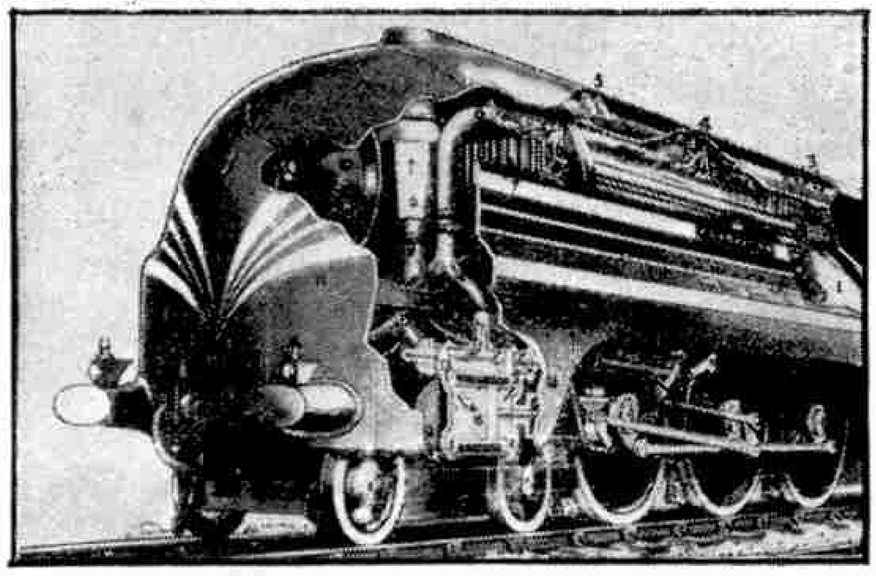

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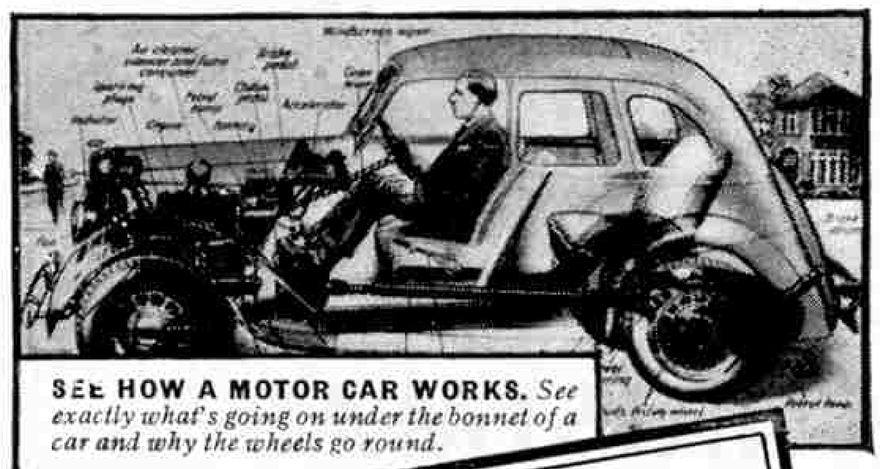

SEE HOW A MOTOR CAR WORKS. *See exactly what's going on under the bonnet of a car and why the wheels go round.*

SEE HOW THEY WORK

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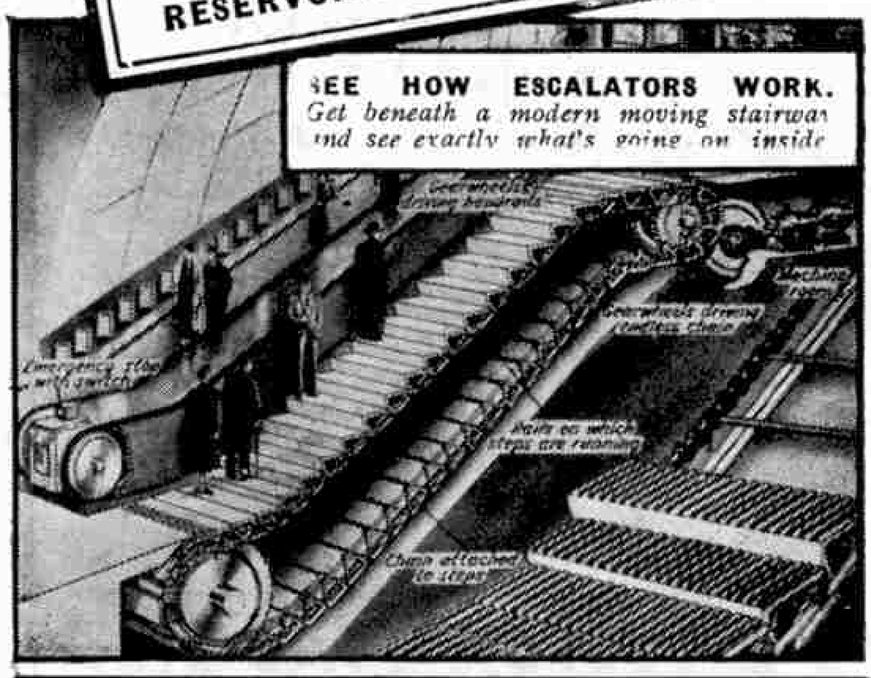

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★ There's not a boy or man who has not wondered at some time why an aeroplane can fly—how an escalator works—how we get electricity—how men can build under the sea. Now, at last, you can see for yourself exactly how these, and scores of other remarkable achievements are accomplished. Hundreds and hundreds of wonderful diagrams and photographs, clear descriptions and explanations in simple language!

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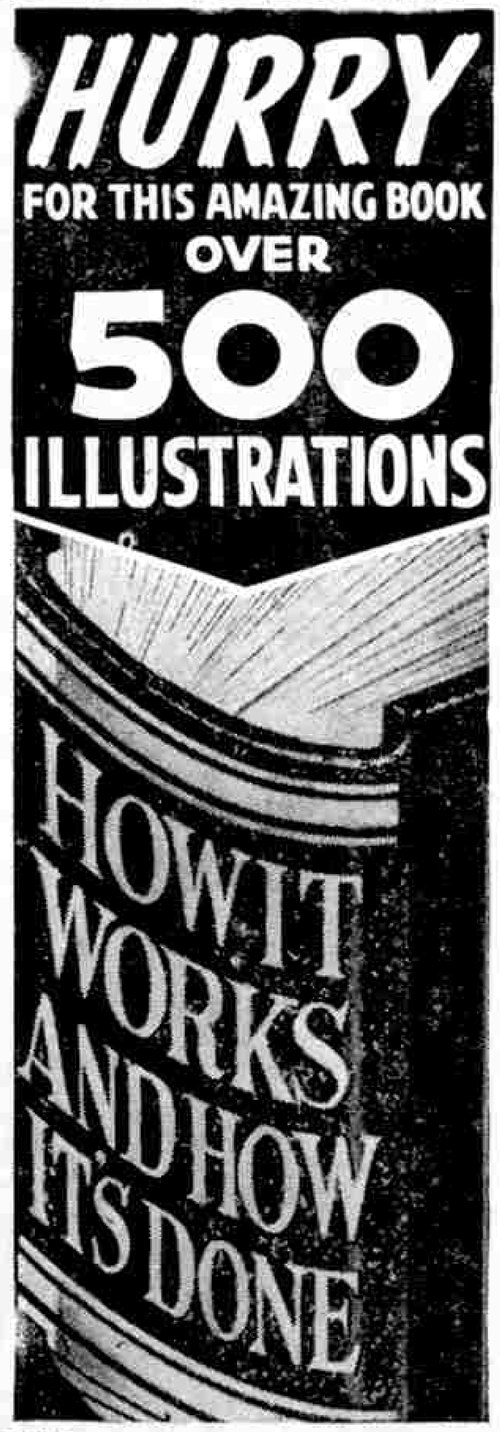

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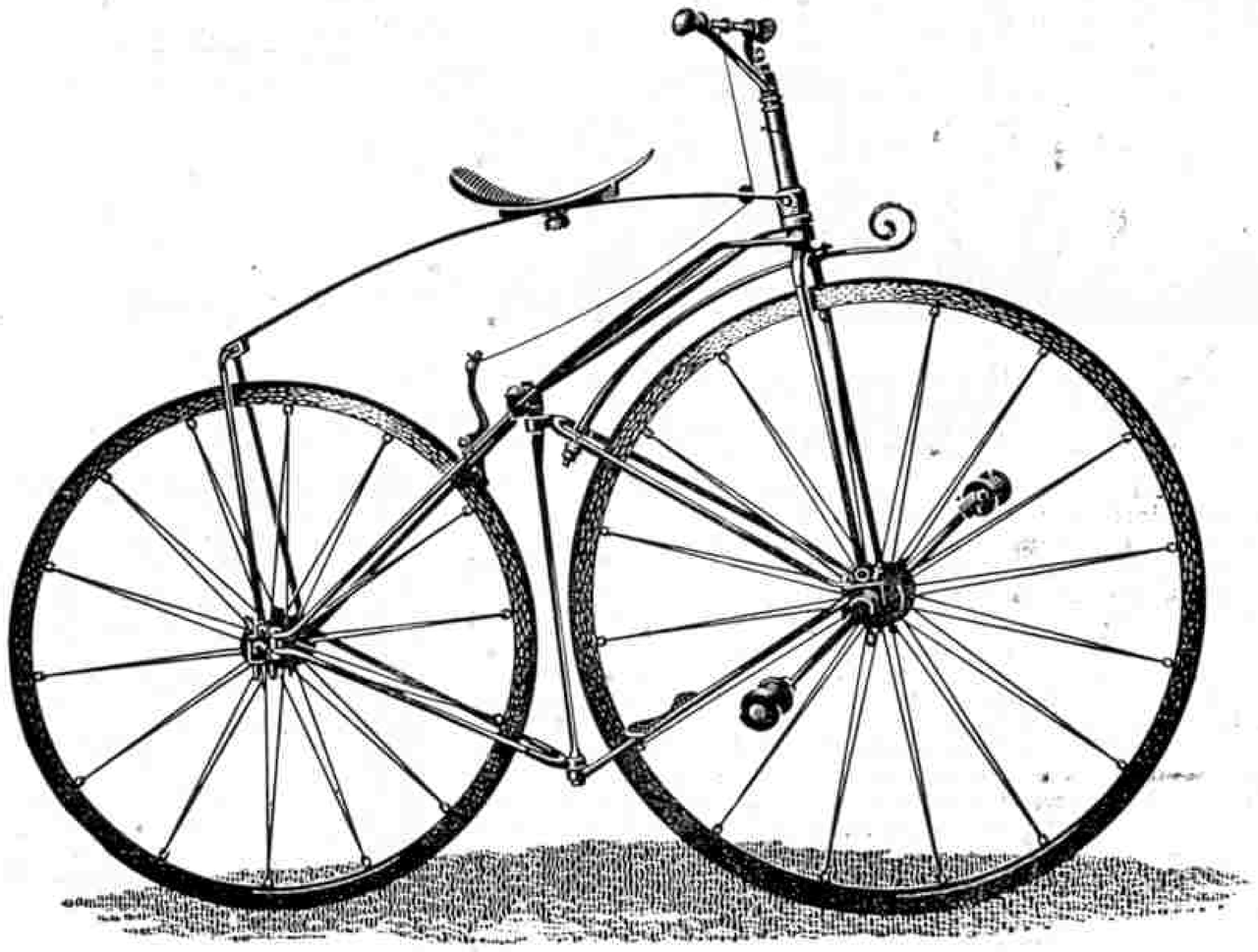
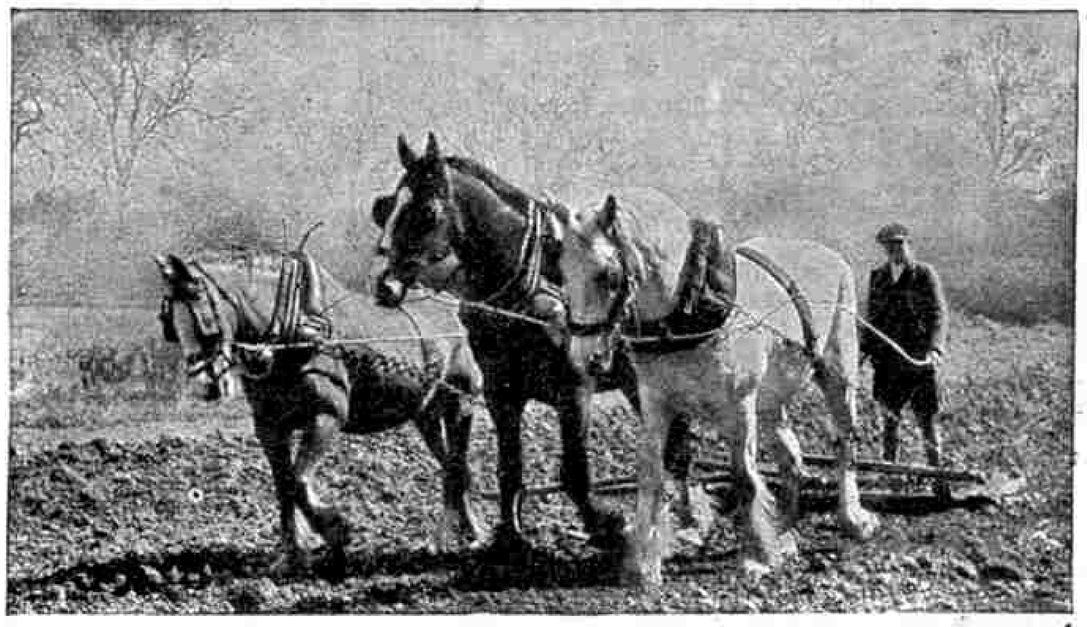


H. W. Bartleet the well-known cycling historian tells us that rubber tyres were introduced round about 1868 on a 'boneshaker' type of bicycle ridden by one J. Hastings, who subjected his innovation to a gruelling test over thirty miles of snow-covered terrain. The tyres consisted of strips of canvas-backed rubber, nailed on top of the iron rim or felloe.

THE PHANTOM
One of the first machines to be fitted with rubber tyres.

. . . BUT THE MOST OUTSTANDING ACHIEVEMENT *in cycling history was that of a Scottish veterinary surgeon, John Boyd* DUNLOP, *whose invention in* 1888 *of the pneumatic tyre was destined to revolutionise mechanical transport.*

IH/304



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FOR YOUR PRINTS—AMIDOL or M.Q. AMIDOL is recognised as the best developer for all Bromide papers. M.Q. is the most popular of all for developing gaslight papers.
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M.Q.—The Johnsons packet makes 4 to 10 ozs. ... ... **3½d.**
AND FOR BOTH FILMS AND PAPERS—JOHNSONS ACID-FIXING.
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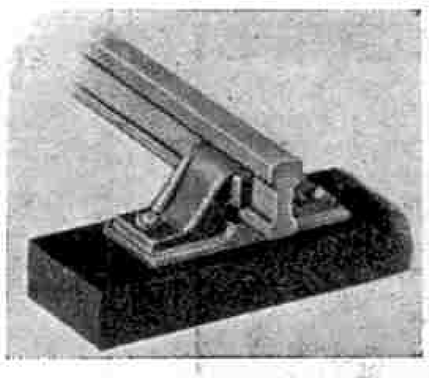

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4 mm. Scale 00 Gauge

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Sale. At least £20 of Hornby Gauge "0" Trains; new condition; offers. For particulars—14, Walter Road, Smethwick, Staffs.

Sale. "Meccano Magazines," April 1924–December 1929. Good condition. Offers—41, Wilmington Road, Birmingham 32.

Wanted. "Meccano Magazine" Jan. 1940.—Crawshaw, Dover College, Poltimore, Exeter.

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(Continued from page 328)

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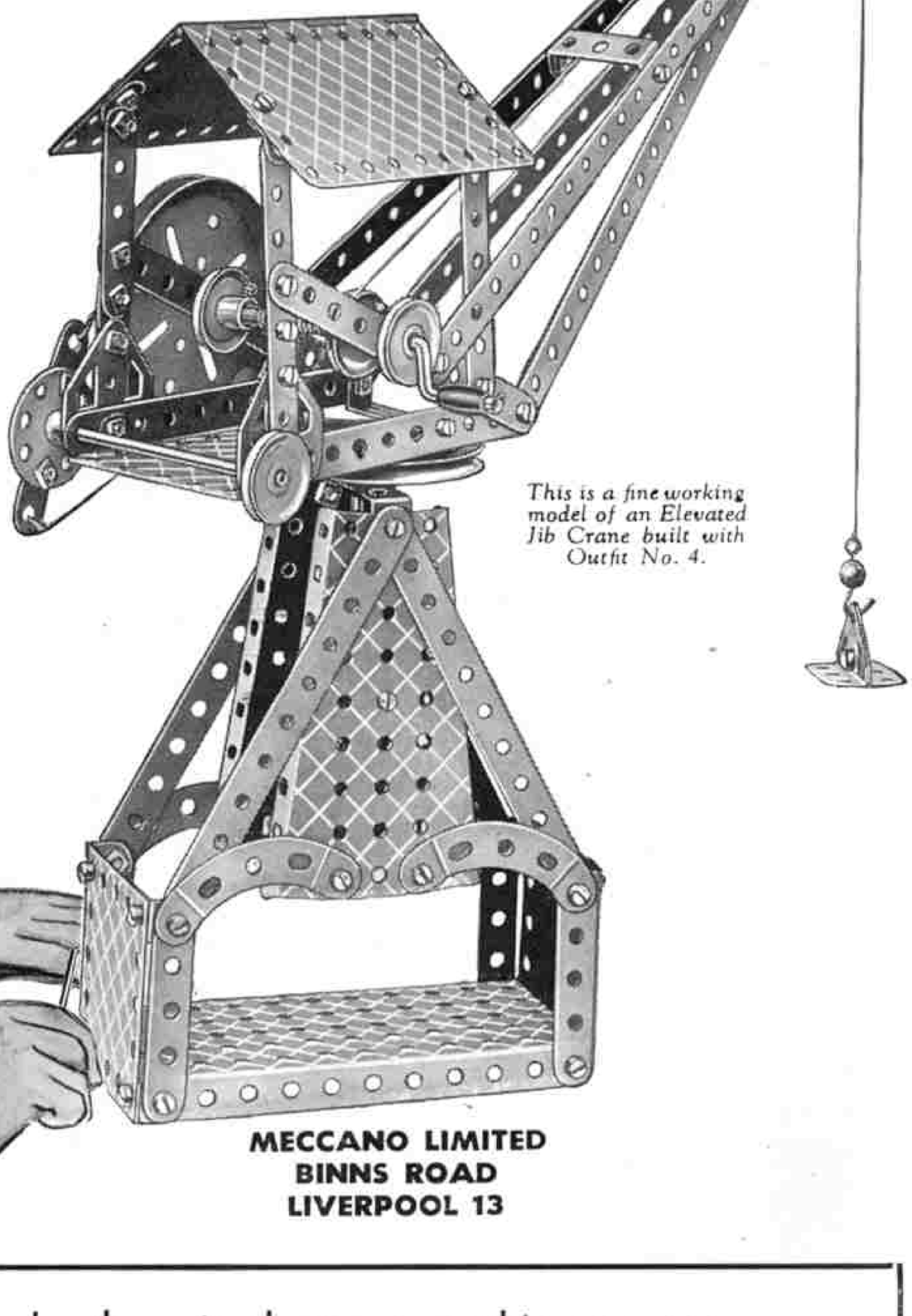

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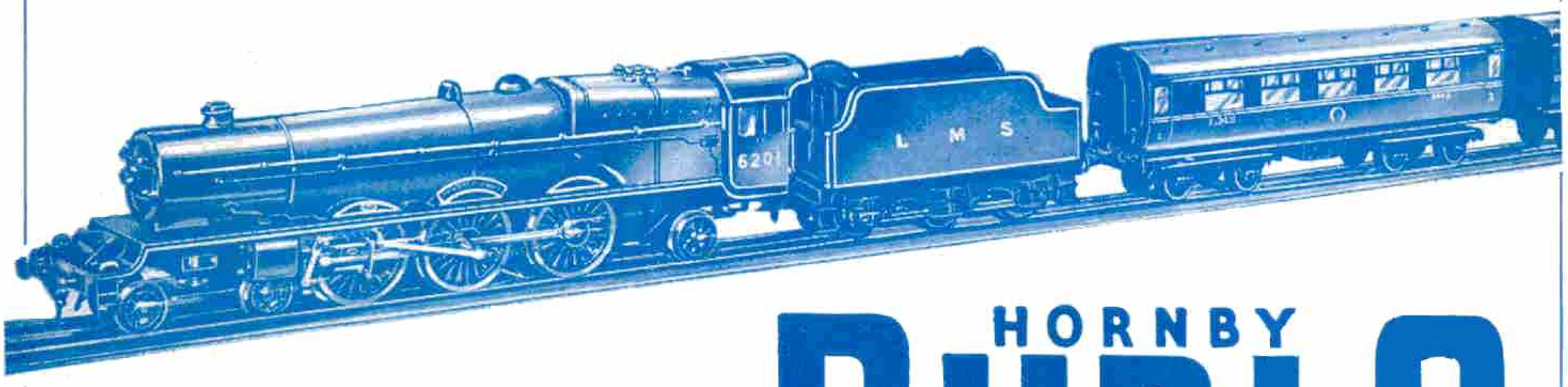

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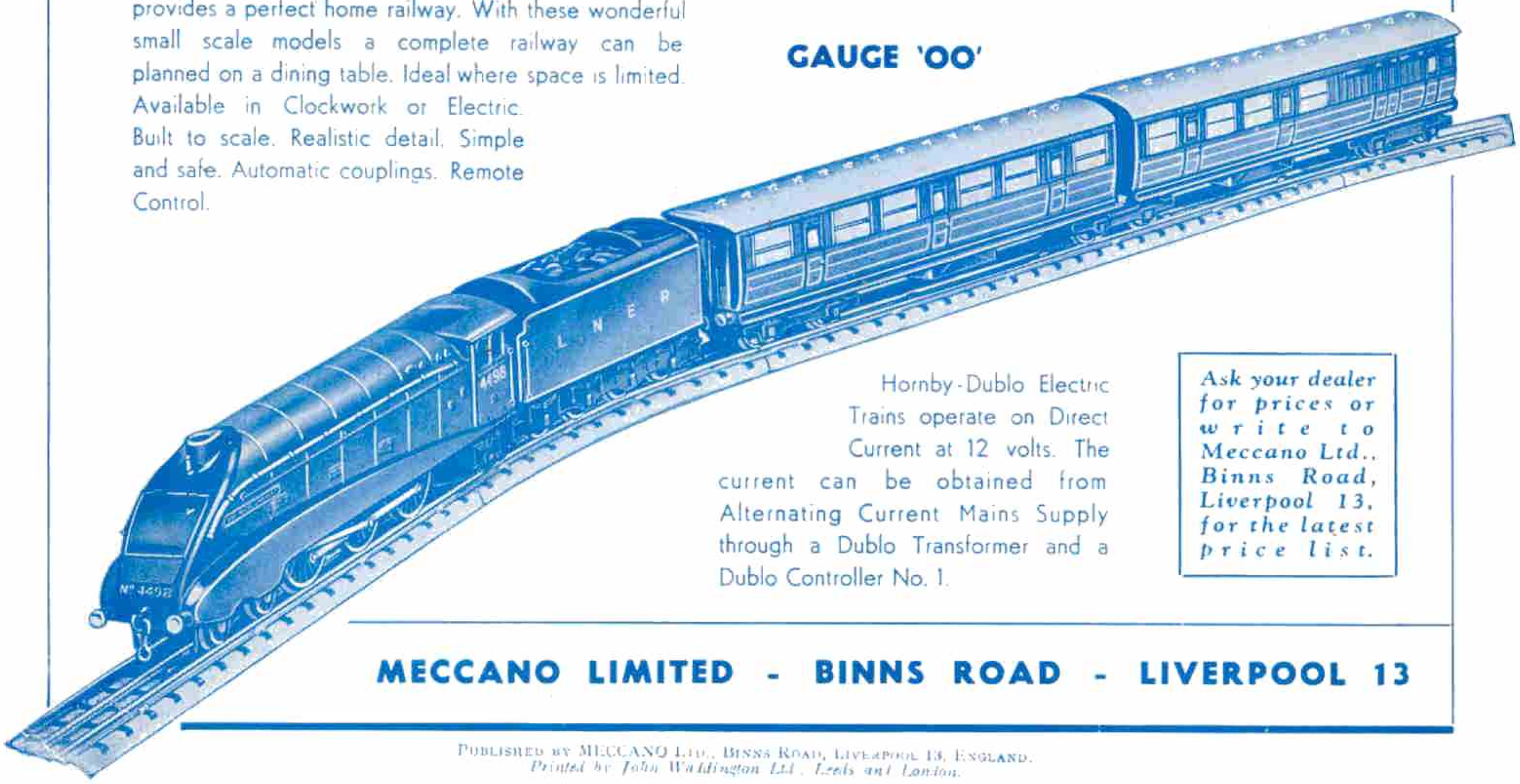

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